

Microsoft[®] MS-DOS[®]

Operating System version 5.0

Getting Started

Microsoft[®]

Microsoft® MS-DOS®

Getting Started

for the MS-DOS Operating System

VERSION 5.0

Microsoft Corporation

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Chapter 1

Before You Set Up MS-DOS 5.0

1

Microsoft® MS-DOS® operating system is the most widely used operating system for personal computers. MS-DOS version 5.0 provides a number of significant improvements over previous versions of DOS. These improvements include:

- More memory for applications.
- **Unformat** and **undelete** commands, with which you can retrieve deleted files and reformatted disks.
- An improved MS-DOS Shell, which is a graphical interface that offers you a visual way to work with MS-DOS and enables you to run more than one application at a time.
- Online Help in MS-DOS Shell and at the MS-DOS command prompt.

Read this chapter before you set up MS-DOS 5.0. This chapter shows you how to find other information and instructions included in this package.

Finding the Information You Need

You received two guides, online Help, and online text files with MS-DOS 5.0:

- This book, *Microsoft MS-DOS Getting Started*, explains what to do before you start using MS-DOS 5.0. It also provides troubleshooting information and answers many common questions about MS-DOS 5.0. It is best to begin with this book.
- The *Microsoft MS-DOS User's Guide and Reference* explains how to use MS-DOS 5.0 and how to get the most out of your system. It also contains an alphabetic reference of MS-DOS commands.

- The Help system provides information once you start using MS-DOS 5.0. For information about using Help in MS-DOS Shell, see Chapter 3 of the *Microsoft MS-DOS User's Guide and Reference*. For information about MS-DOS command-line Help, see Chapter 2 of the *Microsoft MS-DOS User's Guide and Reference*.
- The README.TXT and APPNOTES.TXT files contain information about using specific hardware and software with MS-DOS 5.0.

As you work with MS-DOS 5.0, refer to the following table to quickly locate the information you need.

To learn about	Read
Batch programs	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 10
Common questions	<i>Microsoft MS-DOS Getting Started</i> , Chapter 4
Computer basics	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 1
Customizing your system	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 11
Device drivers	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 15
Doskey program	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 7
Hard-disk partitions	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 6
Installing MS-DOS	<i>Microsoft MS-DOS Getting Started</i> , Chapter 2
International support	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 13 and Appendix
MS-DOS Editor	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 9
MS-DOS Shell	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapters 3 and 8
Help (online)	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapters 2 and 3
Optimizing memory	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 12
Specific commands	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 14
Troubleshooting	<i>Microsoft MS-DOS Getting Started</i> , Chapter 3
Upper memory area	<i>Microsoft MS-DOS User's Guide and Reference</i> , Chapter 12

Document Conventions

The following typographical conventions are used in this guide.

<u>Type style</u>	<u>Used for</u>
bold	Command names, switches, and any text you must type exactly as it appears. To carry out a command, type the command name, and then press the ENTER key.
<i>italic</i>	Parameters. Text you type replaces the item shown in italic. For example, if you want to use a parameter that calls for a <i>filename</i> , you must type the name of a specific file. New terms also appear in italic type. The term is explained when it first occurs. In addition, italic type is used for emphasis in certain examples.
ALL CAPITALS	Directory names, filenames, and acronyms. When you type directory names and filenames, you can use lowercase letters.

Key combinations appear in the following format.

<u>Notation</u>	<u>Meaning</u>
KEY1+KEY2	A plus sign (+) between key names means you must press the second key before you release the first key. For example, "Press CTRL+C" means that you press and hold down CTRL while you press C.

Chapter 2

Installing MS-DOS 5.0

2

Before you can use MS-DOS 5.0, you must run the Setup program. You cannot run MS-DOS 5.0 directly from the Setup disks because the files on those disks are compressed. Setup expands the files and copies them to your hard disk or floppy disks. When you complete Setup, you can start using MS-DOS 5.0.

Preparing for Setup

During Setup, you will be prompted to provide the following information:

- The current time and date.
- Which country's time and date formats you want to use.
- Which country's keyboard layout you have.
- Whether you are installing MS-DOS 5.0 on a hard disk or floppy disks.
- The directory in which you want to store MS-DOS 5.0 files.
Setup places the files in a directory called DOS by default. Accept this choice unless you have a specific reason for giving the directory a different name.
- Whether you want MS-DOS Shell (a graphical interface) to appear each time you start your system.
- Whether to create a single MS-DOS partition that occupies your entire hard disk.

This option appears only if your hard disk has free space and does not already contain a DOS partition. In this case, Setup creates one MS-DOS partition by default. Accept this choice unless you need to reserve some disk space for another operating system or you want to use more than one logical drive.

For more information about partitions, see Chapter 6 in the *Microsoft MS-DOS User's Guide and Reference*.

Setting Up MS-DOS 5.0 on a Hard Disk

To set up MS-DOS 5.0, you need the Setup disks included in the MS-DOS 5.0 package.

► To set up MS-DOS 5.0 on a hard disk:

1. Insert Setup Disk 1 in your computer's floppy disk drive (drive A).
2. Start your computer.
3. Follow the instructions on your screen.

If you have questions about any of the procedures or options, press F1 for Help.

Creating a Startup Disk

After you install MS-DOS 5.0, create a *startup (boot) disk*. A startup disk is a floppy disk you can use to start MS-DOS 5.0 if your hard disk fails.

► To create a startup disk:

1. Insert a newly formatted floppy disk in drive A.
2. Type `sys a:`

MS-DOS copies system files to the floppy disk.

If your hard disk fails, you can start MS-DOS 5.0 by inserting the startup disk in drive A and restarting your computer.

Setting Up MS-DOS 5.0 on Floppy Disks

For this procedure, you need to provide and label a number of floppy disks. These disks must be compatible with the ones you use in your startup (boot) disk drive.

If you have high-density (1.2 MB) 5.25-inch Setup disks, you need to supply three high-density (1.2 MB) 5.25-inch disks. Or, you can use three high-density (1.44 MB) 3.5-inch disks.

Label the disks as follows:

- Startup/Support/Shell
- Help/Basic/Edit/Utility
- Supplemental

If you have 3.5-inch (720K) Setup disks, you need to supply four double-density (720K) or high-density (1.44 MB) 3.5-inch disks. Or, you can use four high-density (1.2 MB) 5.25-inch disks.

Label the disks as follows:

- Startup/Support
- Shell/Help
- Basic/Edit/Utility
- Supplemental

If you have two floppy disk drives, you can speed up installation by putting Setup disks in one drive and the disks you labeled in the other drive. The capacity of the drive that contains the disks you labeled must be at least as great as the drive containing the Setup disks. The disks you labeled must also be compatible with drive A (the startup drive).

► **To set up MS-DOS 5.0 on floppy disks:**

1. Insert Setup Disk 1 in drive A or B.
2. If you use drive A, type the following at the command prompt:
a:\setup /f
If you use drive B, type:
b:\setup /f
3. Follow the instructions on your screen.
If you have questions about any of the procedures or options, press F1 for Help.

You can run MS-DOS 5.0 with the disks you labeled. To begin using them, insert the Startup/Support/Shell disk (5.25-inch disks) or the Startup/Support disk (3.5-inch disks) in drive A, and restart your computer.

For a list of files on each Setup disk, see the Appendix, "Contents of the Setup Disks." For a list of the files on the disks you labeled, see the PACKING.LST file, which is located on Setup Disk 1 (5.25-inch disks) or Setup Disk 2 (3.5-inch disks).

Chapter 3

Troubleshooting

3

This chapter explains how to solve problems you might encounter while using MS-DOS 5.0.

Many of the procedures outlined in this chapter require you to modify files, such as your CONFIG.SYS or AUTOEXEC.BAT file, by using a text editor. MS-DOS 5.0 includes a full-screen, menu-driven text editor that was designed for this purpose. For information about how to use MS-DOS Editor, see Chapter 9 of the *Microsoft MS-DOS User's Guide and Reference*.

If you prefer to use a word-processing program, such as WordPerfect or Microsoft Word, be sure to save the file as an unformatted, or ASCII, text file. Your computer may fail if you save your CONFIG.SYS or AUTOEXEC.BAT file in your word processor's format.

CAUTION Be careful when editing your CONFIG.SYS and AUTOEXEC.BAT files. Your computer runs them every time you turn it on. These files provide important information, such as which device drivers to install, how MS-DOS 5.0 uses memory and controls files, and the search path you want MS-DOS 5.0 to use. Also, be careful when editing files whose filename extension is .INI. These files provide important information about how to configure specific programs.

Be sure to make a backup copy of your CONFIG.SYS or AUTOEXEC.BAT file before you begin editing the original.

You receive the “ERROR: Unable to control A20 line” message

The “ERROR: Unable to control A20 line” message indicates that the HIMEM.SYS extended memory manager did not load properly. Therefore, it cannot make extended memory or the high memory area (HMA) available to MS-DOS 5.0 or your programs.

► **To load HIMEM.SYS properly:**

1. Create an MS-DOS 5.0 startup (boot) disk. To do so, insert a formatted floppy disk in drive A, and type the following:

```
sys c: a:
```

2. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
3. Make sure your CONFIG.SYS file contains a **device** command for HIMEM.SYS. The command should appear before any other device commands and should look like the following:

```
device=c:\dos\himem.sys
```

4. Add the **/cpuclock:on** switch to the **device** command for HIMEM.SYS. The command should now appear as follows:

```
device=c:\dos\himem.sys /cpuclock:on
```

5. Save the CONFIG.SYS file, and quit your text editor.
6. Restart your computer by pressing CTRL+ALT+DEL.

Watch the messages that your computer displays during startup. If HIMEM.SYS is working properly, it should display a message like the following:

```
Loaded A20 handler no. 1
64K High Memory Area is available.
```

You have solved the problem if the “ERROR: Unable to control A20 line” message does not appear, HIMEM.SYS starts successfully, and your system appears to be working properly.

If you still see the “ERROR: Unable to control A20 line” message, continue with the next step.

7. Edit your CONFIG.SYS file again. Locate the **device** command for HIMEM.SYS, and add the **/machine** switch to it. The **/machine** switch specifies the type of computer you have. The switch should be followed by a colon (:) and your machine number (see the table following this procedure). For example, the following **device** command specifies that your computer is a Toshiba 5100 (machine number 7):

```
device=c:\dos\himem.sys /cpuclock:on /machine:7
```

8. Save the CONFIG.SYS file, and quit your text editor.
9. Restart your computer by pressing CTRL+ALT+DEL.

Watch the messages that your computer displays during startup. If HIMEM.SYS is working properly, it should display a message like the following:

Loaded A20 handler no. 1
64K High Memory Area is available.

If the machine number you specified is still incorrect, HIMEM.SYS might display an error message, or your system might fail when you restart it. In that case, insert the startup (boot) disk in drive A, and restart your system. Then, edit your CONFIG.SYS file, specify a different machine number, save your changes, and restart your system. You might need to try several machine numbers before you identify the one that works for your computer.

The following table lists machine types in alphabetic order and shows the corresponding number to specify with the /machine switch.

Machine type	Number
Acer 1100	6
AT&T 6300 Plus	5
Bull Micral 60	16
COMPUADD 386 systems	1 or 8
CSS Labs	12
Datamedia 386/486	2
Hitachi HL500C	8
HP Vectra	14
HP Vectra (A and A+)	4
IBM PC/AT	1
IBM PC/AT	11
IBM PC/AT (alternative delay)	12
IBM PC/AT (alternative delay)	13
IBM PS/2	2
Intel 301z or 302	8
JDR 386/33	1
Philips	13
Phoenix Cascade BIOS	3, 1, or 8
Toshiba 1600 and 1200XE	7
Toshiba 5100	7
Tulip SX	9
UNISYS PowerPort	2
Wyse 12.5 MHz 286	8
Zenith ZBIOS	10

If your computer is not on the preceding list, you are not sure which number to use, or the machine number for your computer doesn't solve the problem, try these machine numbers in the following order: 1, 11, 12, 13, 8, 2–10, 14–16.

For more information about HIMEM.SYS, see Chapter 15 of the *Microsoft MS-DOS User's Guide and Reference*.

You receive the “Incorrect DOS version” message when you start an application

You might be able to solve this problem by using the **setver** command. For more information, see “What is setver and how do I use it?” in Chapter 4, “Common Questions About MS-DOS 5.0.”

You receive the “Packed file corrupt” message

MS-DOS 5.0 displays the “Packed file corrupt” message when a program cannot be successfully loaded into the first 64K of conventional memory. This error is most likely to occur when you load device drivers into the upper memory area, thereby freeing more of the first 64K of conventional memory.

MS-DOS 5.0 provides the **loadfix** command, which ensures that a program is loaded above the first 64K of conventional memory. To use the **loadfix** command, include it at the beginning of the command that starts the program. Use the following syntax:

loadfix [drive:][path]filename [program-parameters]

For example, to ensure that a program file named MYAPP.EXE (in the APPS directory of drive C) is loaded above 64K, you would type the following at the command prompt or include the command in your AUTOEXEC.BAT file:

loadfix c:\apps\myapp.exe

MS-DOS Shell won't start or switch between programs

This section explains what to do if MS-DOS Shell won't start after you type **dosshell** at the command prompt or if you cannot switch between programs in MS-DOS Shell.

The solution to this problem depends on whether your computer has:

- A conflict with memory-resident drivers or programs.
- Incorrect or corrupt MS-DOS Shell files.

Read the following sections in order, and try the solutions that apply to your computer.

Removing memory-resident programs and drivers

MS-DOS Shell might not work properly if a memory-resident program (TSR) or driver conflicts with it. If you are having problems with MS-DOS Shell, try starting your computer without running memory-resident programs and drivers.

► To start your computer without memory-resident programs or drivers:

1. Create a startup (boot) disk by inserting a formatted disk in drive A and typing the following:
sys c: a:
2. Make sure the startup disk is in drive A, and restart your computer by pressing CTRL+ALT+DEL.
3. To determine whether your CONFIG.SYS and AUTOEXEC.BAT files are causing problems, type the following at the command prompt:

c:\dos\dosshell

If MS-DOS Shell starts, one or both of these files are probably causing problems. If MS-DOS Shell doesn't start, these files might not be the cause. In this case, skip to the following section, "Incorrect or corrupt MS-DOS Shell files."

4. Remove the startup disk from drive A, and restart your computer by pressing CTRL+ALT+DEL.

► **To determine whether your AUTOEXEC.BAT file is causing the problem:**

1. Rename your CONFIG.SYS file by typing the following at the command prompt:
ren config.sys config.bak
2. Restart your computer by pressing CTRL+ALT+DEL. If MS-DOS Shell doesn't start each time you turn on your system, type the following at the command prompt:
dosshell
If MS-DOS Shell doesn't start, your AUTOEXEC.BAT file is causing the problem; proceed to step 3.
If MS-DOS Shell starts, the problem is probably with your CONFIG.SYS file, not your AUTOEXEC.BAT file; skip to the following procedure.
3. Use a text editor, such as MS-DOS Editor, to open the AUTOEXEC.BAT file.
4. Insert the **rem** command in front of every command in your AUTOEXEC.BAT file except the **@echo off**, **prompt**, and **path** commands.

For example, your AUTOEXEC.BAT might look like the following:

```
rem dos\share
@echo off
prompt $p$g
path c:\dos
rem temp=c:\temp
rem tmp=c:\temp
rem init=c:\init

rem start workstation
rem logon johnd

rem netime time
rem net use l: \\john\doe
rem net use lpt1: \\john\doe
rem mode spe=high
rem cd \qs
rem quickshr - - - y \qs
rem cd \
```

5. Save your AUTOEXEC.BAT file.
6. To determine which command is causing a problem, remove the first **rem** command from the first command line. Save your AUTOEXEC.BAT file, restart your computer by pressing CTRL+ALT+DEL, and try to start MS-DOS Shell by typing **dosshell** at the command prompt. Repeat these steps until MS-DOS Shell does *not* start. When it doesn't start, you have identified a command that conflicts with MS-DOS Shell.

7. Rename your CONFIG.SYS file by typing the following at the command prompt:
ren config.bak config.sys
8. After you identify the command that is causing problems, insert the **rem** command in front of it in your AUTOEXEC.BAT file. Then restart your computer. If MS-DOS Shell still doesn't start, you might have more than one command that is causing problems. In this case, repeat steps 3 through 6, as applicable. After you identify the driver or program that is causing the problem, you have two options:
 - If the driver or program is not essential, you can disable it by using the **rem** command, as described earlier in this procedure.
 - You can contact the manufacturer of the driver or program for further assistance.

► **To determine whether your CONFIG.SYS file is causing the problem:**

1. Rename your AUTOEXEC.BAT file by typing the following at the command prompt:
ren autoexec.bat autoexec.bak
2. Restart your computer by pressing CTRL+ALT+DEL, and type the following at the command prompt:
c:\dos\dosshell
If MS-DOS Shell *doesn't* start, your CONFIG.SYS file is causing problems; proceed to step 3.
If MS-DOS Shell starts, there is probably no problem with your CONFIG.SYS file; skip to step 9.
3. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
4. Insert the **rem** command in front of every command in your CONFIG.SYS file, except lines with device drivers that are needed to run hardware (such as a disk drive, monitor, or keyboard) and lines with **files** and **buffers** commands. Make sure you type the **rem** command in front of the mouse driver command, if there is one.
5. Change the **files** and **buffers** commands to the following:
files=30
buffers=30
If your CONFIG.SYS file does not have these commands, add them.
6. Save your CONFIG.SYS file.

7. To determine which driver is causing a problem, remove the first **rem** command from the first command line. Save your CONFIG.SYS file, restart your computer by pressing CTRL+ALT+DEL, and try starting MS-DOS Shell by typing **c:\dos\dosshell** at the command prompt. Repeat these steps until MS-DOS Shell does *not* start. When it doesn't start, you have identified a command that conflicts with MS-DOS Shell.
8. Rename your AUTOEXEC.BAT file by typing the following at the command prompt:
ren autoexec.bak autoexec.bat
9. After you identify the command that is causing problems, insert the **rem** command in front of it in your CONFIG.SYS file. Then restart your computer, and try using MS-DOS Shell. If MS-DOS Shell still doesn't start, you might have more than one command that is causing problems. In this case, repeat steps 3 through 7, as applicable.

After you identify the driver or program that is causing problems, you have two options:

- If the driver or program is not essential, you can disable it by using the **rem** command, as described earlier in this procedure.
- You can contact the manufacturer of the driver or program for further assistance.

Incorrect or corrupt MS-DOS Shell files

Sometimes Setup identifies your monitor incorrectly and copies the wrong video files to your system. Video or MS-DOS Shell files can also become corrupt during or after Setup. MS-DOS Shell does not work properly if the following files are incorrect or corrupt:

DOSSHELL.EXE
DOSSHELL.GRB
DOSSHELL.INI
DOSSWAP.EXE
DOSSHELL.COM
DOSSHELL.VID

If you are having problems with MS-DOS Shell, try expanding these files from your Setup disks.

► **To expand MS-DOS Shell files:**

1. Preserve your DOSSHELL.INI file by renaming it.

For example, if this file is in the DOS directory, change to the directory by typing `cd \dos` at the command prompt. Then type the following command:

```
ren dosshell.ini dosshell.old
```

2. Use the **expand** command to expand and copy the DOSSHELL.EX_, DOSSHELL.CO_, and DOSSWAP.EX_ files to your DOS directory. Check the Appendix, "Contents of the Setup Disks," to determine which disk the files are on.

If the files you want to expand are on a disk in drive A and you want to expand the files to the DOS directory on drive C, type the following at the command prompt:

```
expand a:\dosshell.ex_ c:\dos\dosshell.exe  
expand a:\dosshell.co_ c:\dos\dosshell.com  
expand a:\dosswap.ex_ c:\dos\dosswap.exe
```

3. Find your monitor type in the following list, then expand and rename the files by typing the specified commands at the command prompt.

For a monochrome monitor, type:

```
expand a:\mono.gr_ c:\dos\dosshell.grb  
expand a:\mono.in_ c:\dos\dosshell.ini
```

Note that a monochrome monitor does not require a .VID file.

For a CGA monitor, type:

```
expand a:\cga.gr_ c:\dos\dosshell.grb  
expand a:\cga.in_ c:\dos\dosshell.ini  
expand a:\cga.vi_ c:\dos\dosshell.vid
```

For an EGA monitor, type:

```
expand a:\ega.gr_ c:\dos\dosshell.grb  
expand a:\ega.in_ c:\dos\dosshell.ini  
expand a:\ega.vi_ c:\dos\dosshell.vid
```

For an EGA monochrome monitor, type:

```
expand a:\legamono.gr_ c:\dos\dosshell.grb  
expand a:\mono.in_ c:\dos\dosshell.ini  
expand a:\ega.vi_ c:\dos\dosshell.vid
```

For a VGA monitor (or Super VGA, XGA, or other high-resolution monitor), type:

```
expand a:\vga.gr_ c:\dos\dosshell.grb
expand a:\ega.in_ c:\dos\dosshell.ini
expand a:\vga.vi_ c:\dos\dosshell.vid
```

For an 8514 color monitor, type:

```
expand a:\vga.gr_ c:\dos\dosshell.grb
expand a:\ega.in_ c:\dos\dosshell.ini
expand a:\8514.vi_ c:\dos\dosshell.vid
```

For a VGA monochrome (or VGA, Super VGA, XGA, or other high-resolution monochrome monitor), type:

```
expand a:\vgamono.gr_ c:\dos\dosshell.grb
expand a:\mono.in_ c:\dos\dosshell.ini
expand a:\vga.vi_ c:\dos\dosshell.vid
```

For an 8514 monochrome monitor, type:

```
expand a:\vgamono.gr_ c:\dos\dosshell.grb
expand a:\mono.in_ c:\dos\dosshell.ini
expand a:\8514.vi_ c:\dos\dosshell.vid
```

For a Hercules monitor, type:

```
expand a:\herc.gr_ c:\dos\dosshell.grb
expand a:\mono.in_ c:\dos\dosshell.ini
expand a:\herc.vi_ c:\dos\dosshell.vid
```

You receive the “Check the Mouse Compatibility List” message when you start MS-DOS Shell

This section explains what to do if you receive the following message the first time you start MS-DOS Shell:

Check the Mouse Compatibility List.

The mouse driver on your computer is
version x.x.x.

See the 'Getting Started' manual for a list of
mouse drivers that are compatible with MS-DOS
version 5.0, and make sure your driver is
compatible.

If your mouse driver is not on the list, and
you have problems using your mouse, contact
your mouse vendor for an updated driver.

<Disable Mouse> <Use Mouse Anyway>

► **To make your mouse driver compatible with MS-DOS Shell:**

1. Note which version number is displayed in the message.
2. Read the following table to find out whether your mouse is compatible with MS-DOS Shell.
3. If your mouse is compatible, choose the Use Mouse Anyway button at the bottom of your screen. If you already chose the Disable Mouse button, reenable your mouse. For instructions, see “Changing your mind about disabling or enabling your mouse” later in this section.

If you have a Microsoft or IBM PS/2 mouse that is not compatible (according to the Mouse Compatibility List), choose the Disable Mouse button, and then update your mouse driver with the mouse driver included with the MS-DOS 5.0 Upgrade. For more information, see the following section, “Upgrading Your Microsoft or IBM PS/2 Mouse.”

If you do not have a Microsoft Mouse and your mouse is not compatible with MS-DOS Shell (according to the Mouse Compatibility List), contact your vendor for an updated mouse driver.

In the meantime, you can try to use your current mouse driver with MS-DOS Shell by choosing the Use Mouse Anyway button at the bottom of your screen. If you have problems using your mouse with MS-DOS Shell, do not use it with other programs. Your computer may fail while you are using an incompatible mouse driver. To disable your mouse, choose the Disable Mouse button.

Mouse Compatibility List for MS-DOS Shell

Type of mouse	Compatible versions
Microsoft	If the MS-DOS Shell mouse message appears, your mouse is incompatible, and you should install the updated MOUSE.COM file (version 7.04) included with MS-DOS 5.0.
Logitech	If the MS-DOS Shell mouse message appears, your mouse is incompatible, no matter what number is displayed. The number in the message differs from the actual version number of your mouse. If you have a version earlier than 5.01, contact Logitech for an update.
Genius	MS-DOS Shell displays “version unknown” or a random number for Genius. Version 9.06 or later is compatible. Check your mouse package or startup message to determine which version you have.
IBM PS/2	If the MS-DOS Shell mouse message appears, your mouse is incompatible, and you should install the updated MOUSE.COM file (version 7.04) included with MS-DOS 5.0.

Mouse Compatibility List for MS-DOS Shell

Type of mouse	Compatible versions
Hewlett-Packard	If the MS-DOS Shell mouse message appears, your mouse is incompatible. Version 7.04 or later is compatible. Contact your vendor for an update.
Mouse Systems	MS-DOS Shell displays "version unknown" or a random number for Mouse Systems. Version 7.01 or later is compatible. Check your mouse package or startup message to determine which version you have.
ATI	MS-DOS Shell displays "version unknown" or a random number for ATI. Version 2.0 or later is compatible. Check your mouse package or startup message to determine which version you have.

NOTE The version number displayed by MS-DOS Shell might not correspond with the actual version number of your mouse driver. The information in this table was supplied by the mouse manufacturers. It is possible that Microsoft has not verified whether the versions listed in the table work successfully with MS-DOS Shell.

Changing your mind about disabling or enabling your mouse

The "Check the Mouse Compatibility List" message appears only the first time you start MS-DOS Shell. After you choose the Disable Mouse or Use Mouse Anyway button, you can reverse your decision only by editing a file named DOSSHELL.INI.

If you chose the Use Mouse Anyway button but have trouble with the mouse, you can disable it by carrying out the following procedure.

► To disable your mouse in MS-DOS Shell:

1. Use a text editor, such as MS-DOS Editor, to open the file named DOSSHELL.INI in your DOS directory.
2. Find the following command in the DOSSHELL.INI file:

```
mouseinfo=x.xx,ignore
```

There will be a number in place of x.xx.

3. Change the command to the following:

```
mouseinfo=x.xx,disabled
```

Do not change the number in the command.

If you chose the Disable Mouse button but decide you want to use the mouse, you can enable it by carrying out the following procedure.

► **To enable your mouse in MS-DOS Shell:**

1. Use a text editor, such as MS-DOS Editor, to open the file named DOSSHELL.INI in your DOS directory.
2. Find the following command in the DOSSHELL.INI file:

```
mouseinfo=x.xx,disabled
```

There will be a number in place of *x.xx*.

3. Change the command to the following:

```
mouseinfo=x.xx,ignore
```

Do not change the number in the command.

If you obtain an updated mouse driver, you do not need to edit the DOSSHELL.INI file again. The first time you start MS-DOS Shell with an updated mouse driver, MS-DOS Shell changes the **mouseinfo** command in the DOSSHELL.INI file to:

```
mouseinfo=
```

This command indicates that your mouse driver is compatible and enabled.

You are using EMM386 and your computer stops

This section explains what to do if you are using EMM386 and your computer stops. This may occur when you are first starting your computer or when you are loading certain networks or programs.

There are several reasons your computer might stop when you are using EMM386:

- Your hardware may not support EMM386.
- You may be using a memory manager that conflicts with EMM386.
- Your Adaptec controller card may require a device driver to work with EMM386.

- You may not be using the correct version of the HIMEM.SYS or EMM386.EXE file.
- HIMEM.SYS or EMM386.EXE may not be functioning properly.
- A program or device driver may not be able to function in the upper memory area.
- Your disk-caching program may need to be loaded into conventional memory to work with EMM386.
- Another program or device driver and EMM386 may be using the same memory.

Before you begin, create an MS-DOS startup (boot) disk. To do so, insert a formatted floppy disk in drive A and type the following at the command prompt:

sys c: a:

Carry out the following procedures in order. You may have to try several of them before you find one that solves the problem.

Make sure your hardware supports EMM386

You can use EMM386 only on a computer that has an 80386 or higher processor. Make sure your computer hardware supports EMM386.EXE.

If your computer does not have an 80386 or higher processor, you may want to purchase an expanded memory board or a 286 expanded-memory emulator. This hardware provides expanded memory. Contact your vendor to determine whether it provides access to upper memory blocks (UMBs).

Make sure your memory manager doesn't conflict with EMM386

Check to determine whether you are loading another expanded memory manager in your CONFIG.SYS file. If you want to use another 80386 memory manager, such as Quarterdeck QEMM386 or Qualitas 386MAX, do not use EMM386. Most 80386 memory managers have "386" or "EMM" in their filenames. You can find out which memory managers are being loaded by typing the following command:

type c:\config.sys ! more

Make sure your Adaptec controller card has a device driver that works with EMM386

If you have an Adaptec controller card, you may not be able to use EMM386 unless you have the ADAPTEC.SYS device driver. Contact Adaptec for this driver.

Make sure you are using the correct version of the HIMEM.SYS and EMM386.EXE files

EMM386 uses HIMEM to access extended memory. To check whether you have the most current versions of these files, carry out the following procedure.

► To check which version of HIMEM.SYS and EMM386.EXE you are using:

1. At the command prompt, type **dir /s** and the name of the file whose date you want to check. First, type:
dir /s himem.sys
and then:
dir /s emm386.exe
2. MS-DOS displays the name of each subdirectory that contains a copy of the file you specified, in addition to the file's size and date. Note which directory contains the file with the latest date, and note the date it shows.
3. Check your CONFIG.SYS file by typing the following at the command prompt:
type c:\config.sys ! more
4. Look for the two **device** commands that load HIMEM.SYS and EMM386.EXE. They should look something like this (they may have other parameters following them):
device=c:\dos\himem.sys
device=c:\dos\emm386.exe
5. Make sure these **device** commands specify the location of the file with the latest date, which you identified in step 2. If the **device** commands do not specify the file with the latest date, follow these steps:
 - a. Use a text editor to open your CONFIG.SYS file.
 - b. Edit the **device** commands so that both show the location of the most recent version of these files. (Note that both files should have the same date.)
 - c. Save the CONFIG.SYS file.

6. If the files are dated after 04-09-91, you have the most recent version of these files. If you had to make any of the preceding changes, restart your computer by pressing CTRL+ALT+DEL. If you still cannot use EMM386 after you restart your computer, continue to the next procedure.
7. If the date on the most recent version is earlier than 04-09-91, you probably have old versions of the files.

Files on the Setup disks are compressed, and their filenames end with an underscore. Use the **expand** command to expand and copy the correct file from the MS-DOS Setup disks to the directory named in your CONFIG.SYS file. Both files are on Setup Disk 1. To expand the files, do the following:

- a. Put Setup Disk 1 in drive A.
- b. Use the **expand** command to expand and copy the files to the directory specified in your CONFIG.SYS file.

For example, if you need to expand and copy the HIMEM.SYS file to the C:\DOS directory, type the following at the command prompt:

```
expand a:\himem.sy_ c:\dos\himem.sys
```

If you need to expand and copy the EMM386.EXE file to the C:\DOS directory, type the following at the command prompt:

```
expand a:\emm386.ex_ c:\dos\emm386.exe
```

Make sure you specify the correct directory for the HIMEM.SYS and EMM386.EXE files.

- c. Restart your computer by pressing CTRL+ALT+DEL. If you still cannot use EMM386 after you restart your computer, continue to the next procedure.

Make sure HIMEM and EMM386 are functioning properly

This procedure determines whether EMM386, HIMEM, or your hardware is causing the problem. If your computer works properly after you carry out this procedure, EMM386 is causing the problem; continue to carry out the following procedures. If your computer *doesn't* work properly after you carry out this procedure, EMM386 is not causing the problem. Do not carry out any of the following procedures.

► To make sure HIMEM and EMM386 are functioning properly:

1. First, make a disk to test your HIMEM.SYS and EMM386.EXE files. To create the test disk, do the following:
 - a. Insert a formatted floppy disk in drive A, and type the following at the command prompt:
sys c: a:

- b. Copy the CONFIG.SYS file from your root directory to the floppy disk. To do so, type the following at the command prompt:
copy c:\config.sys a:
- c. Use a text editor, such as MS-DOS Editor, to open the CONFIG.SYS file on your floppy disk.
- d. Delete all the lines in the file except the **device** commands loading HIMEM.SYS and EMM386.EXE.
- e. Change the **device** command that loads EMM386.EXE so it looks like this:
`device=c:\dos\emm386.exe noems x=a000-efff`
- f. Save the test CONFIG.SYS file on your floppy disk.
- g. Create a test AUTOEXEC.BAT file.
- h. Type these commands in the new file:
path=c:\dos
prompt \$p\$g
- i. Save the test AUTOEXEC.BAT file on your floppy disk, and quit the text editor.

You now have a test disk with which to test HIMEM.SYS and EMM386.EXE. Your original AUTOEXEC.BAT and CONFIG.SYS files are still on drive C and have not been changed.

- 2. Place your test disk in drive A, and restart your computer by pressing CTRL+ALT+DEL. Your computer should work properly. (Note that you may not have access to certain devices, such as your mouse.)
- 3. If your computer functions properly at this point, HIMEM.SYS works with EMM386.EXE. You can now determine whether any other programs conflict with EMM386. Skip the following step and continue to the next procedure.
- 4. If your computer stopped when you used the test disk in drive A, you may have a problem with HIMEM.SYS or your hardware.

Check whether your disk-caching program must be loaded into conventional memory

Sometimes, loading the SMARTDRV.SYS file into conventional memory solves problems with EMM386. If you use another disk-caching program, remove it temporarily, and replace it with SMARTDRV.SYS by carrying out the following procedure.

► **To replace your disk-caching program with SMARTDRV.SYS:**

1. Copy your original CONFIG.SYS file to the test floppy disk you made by following the previous procedure. Then, type the following at the command prompt:
copy c:\config.sys a:
You will overwrite the CONFIG.SYS file that is already on your test disk.
If you cannot access drive C, restart your computer from the hard disk before performing this step. To do so, take the floppy disk out of drive A, and press CTRL+ALT+DEL.
2. Use a text editor, such as MS-DOS Editor, to open the CONFIG.SYS file on your floppy disk.
3. Add the following line immediately after the command that loads HIMEM.SYS in your CONFIG.SYS file:
device=c:\dos\smartdrv.sys /b+
4. Delete any other lines that load SMARTDRV.SYS or other disk-caching programs.
5. Save the CONFIG.SYS file.
6. With the floppy disk in drive A, restart your computer by pressing CTRL+ALT+DEL.
If your computer works properly now, keep the new **device** command in your CONFIG.SYS file. Copy the version of the CONFIG.SYS file on your floppy disk back to drive C. To do so:
 - a. Make a backup copy of your old CONFIG.SYS file by typing the following:
ren c:\config.sys config.bak
 - b. Then, copy the CONFIG.SYS file from the floppy disk to drive C by typing the following:
copy a:\config.sys c:
7. If your computer still stops, continue to the next procedure. (Do not delete the command you just added to your CONFIG.SYS file. There may be an additional problem that is causing your computer to stop.)

If you usually use a different disk-caching program, it may not be working properly with EMM386. Leave SMARTDRV.SYS in your CONFIG.SYS file for now, and contact the manufacturer of your other disk-caching program for more information about using it with EMM386.

Make sure your programs and device drivers can function in the upper memory area

If you load into the upper memory area only programs and device drivers that came with MS-DOS 5.0, skip this procedure.

If your computer stops only when you load a specific driver or memory-resident program (TSR) with the **devicehigh** or **loadhigh** (or **lh**) command, you may not be able to load that particular driver or TSR into an upper memory block (UMB). MS-DOS 5.0 device drivers and memory-resident programs should load into the upper memory area without any problems. (Exceptions are HIMEM.SYS, EMM386.EXE, and certain hard-disk controllers that require SMARTDRV.SYS to be loaded in to conventional memory.)

If you suspect that loading a driver or program into the upper memory area is causing the problem, you can load it into conventional memory instead. Do this by editing your CONFIG.SYS or AUTOEXEC.BAT file.

Device drivers

If you suspect a device driver is causing the problem, carry out the following procedure.

► To determine if your device drivers work in the upper memory area:

1. Use a text editor, such as MS-DOS Editor, to open the CONFIG.SYS file on the floppy disk you created by following the procedure in the section “Make sure HIMEM and EMM386 are functioning properly” earlier in this chapter.
2. Find the command that loads the device causing the problem. It should begin with a **devicehigh** command, as in the following example:

```
devicehigh c:\drivers\driver.sys
```
3. Replace the **devicehigh** command with the **device** command, so the device is loaded into conventional memory. You may also have to remove a **size** switch. For example, you would change this command:

```
devicehigh size=39e0 c:\drivers\mouse.sys
```

to this:

```
device=c:\drivers\mouse.sys
```
4. Save your CONFIG.SYS file.

5. Restart your computer by pressing CTRL+ALT+DEL.

If loading the device driver with the **devicehigh** command was the problem, your computer should now work properly. Copy the CONFIG.SYS file from your floppy disk to your hard disk. To do so:

- a. Make a backup copy of your old CONFIG.SYS file by typing the following:

```
ren c:\config.sys config.bak
```

- b. Copy the CONFIG.SYS file from the floppy disk to drive C by typing the following:

```
copy a:\config.sys c:\
```

If your computer still stops, try to determine whether it stops after loading the same device driver as before. If it stops when loading the same device driver, continue to the next procedure. If your computer stops while it is loading a different program or device driver, change the **devicehigh** command that loads it to **device**, as described in steps 1 through 4.

Memory-resident programs (TSRs)

If you suspect a memory-resident program (TSR) is causing the problem, edit your AUTOEXEC.BAT file.

► To determine whether a TSR can function in the upper memory area:

1. Copy the AUTOEXEC.BAT file from your hard disk to the floppy disk. To do this, type the following at the command prompt:

```
copy c:\autoexec.bat a:
```

You will overwrite the AUTOEXEC.BAT file you created by following the procedure in the section “Make sure HIMEM and EMM386 are functioning properly” earlier in this chapter.

2. Use a text editor, such as MS-DOS Editor, to open the AUTOEXEC.BAT file on the floppy disk.
3. Find the command that loads the program causing the problem. It should begin with a **loadhigh** (or **lh**) command. For example, if your computer stops after trying to load MYTSR.COM into the upper memory area, you would look for this command:

```
loadhigh c:\mytsr.com
```

or

```
lh c:\mytsr.com
```

4. Remove the **loadhigh** or **lh** command so the program loads into conventional memory. For example, you would change the commands in step 3 to look like this:

```
c:\mytsr.com
```

5. Save your AUTOEXEC.BAT file.
6. Restart your computer by pressing CTRL+ALT+DEL.

If loading the program with the **loadhigh** or **lh** command was the problem, your computer should now work properly. Copy the AUTOEXEC.BAT file from your floppy disk to your hard disk. To do so:

- a. Make a backup copy of your old AUTOEXEC.BAT file by typing the following:

```
ren c:\autoexec.bat autoexec.bak
```

- b. Copy the AUTOEXEC.BAT file from the floppy disk to drive C by typing the following:

```
copy a:\autoexec.bat c:\
```

If your computer still stops, try to determine whether it stops after loading the same program as before. If it stops when loading the same program, continue to the next procedure. If your computer stops when loading a different program or device driver, remove the **loadhigh** command, as described in steps 1 through 5.

Make sure EMM386 and another program or device driver aren't using the same memory

If your computer stops, and none of the preceding solutions have worked, EMM386 may be using the same memory addresses as another program or card. For example, this could happen when you install a network card or a card for a device.

At this point, experiment with the EMM386 command to determine which memory addresses are being used by the other program or device. You can also call the manufacturer of the hardware device to help determine the problem.

If you know you have a card or program that may conflict with EMM386, check the documentation that came with it to see what address space the card or program uses. If the conflict occurs over a network, check with your network administrator to find out what memory addresses are being used. You can then use the **x=** switch when you load EMM386.EXE to prevent EMM386 from using those addresses.

For example, if you use a network card and suspect that it may cause the problem, check the network documentation to see what memory addresses it uses. If it uses the D800h–DFFFh memory addresses, for example, add the **x=d800–dfff** switch to the end of the **device** command that loads EMM386 in your CONFIG.SYS file.

If your original EMM386 command looked like this:

```
device=c:\dos\emm386.exe noems
```

you would edit it to exclude the memory addresses used by your network card:

```
device=c:\dos\emm386.exe noems x=D800-DFFF
```

For more information about EMM386, see Chapters 12 and 15 of the *Microsoft MS-DOS User's Guide and Reference*.

Microsoft Windows 3.0 won't run in 386 enhanced mode

This section explains what to do if Microsoft Windows version 3.0 hasn't run in 386 enhanced mode since you set up MS-DOS 5.0.

Make sure that:

- Your system includes at least 2 MB (2,097,152 bytes) of conventional and XMS memory. To determine the amount of available memory, type **mem** at the command prompt.
If you do not have 2 MB of available conventional and XMS memory, reduce XMS memory usage by removing the **dos=high** command from your CONFIG.SYS file. If you are using SMARTDRV.SYS, reduce the value of the *MinCacheSize* parameter. For more information about the SMARTDrive command line, see Chapter 15 of the *Microsoft MS-DOS User's Guide and Reference*.
- The **device=himem.sys** command appears in your CONFIG.SYS file before any commands that start device drivers or programs that use extended memory.
- The **files** command in your CONFIG.SYS file specifies at least 30 files.
- The **buffers** command in your CONFIG.SYS file specifies at least 20 buffers.
- Your AUTOEXEC.BAT file includes a **set** command that establishes a TEMP variable. This creates an environment variable that Windows 3.0 uses when storing temporary files. For example, the following command directs Windows to store temporary files in a directory named TEMP on drive C:

```
set temp=c:\temp
```

- Your system includes the WINA20.386 file. During Setup, MS-DOS 5.0 places this file in the root directory of your startup drive.

If you can't find the file in any directory, see the Appendix, "Contents of the Setup Disks," to determine which Setup disk contains this file. Then, use the **expand** command to expand and copy the WINA20.38_ file from your Setup disk to the root directory of your startup drive.

For example, if the Setup disk is in drive A and your computer starts from drive C, type the following:

```
expand a:\wina20.38_ c:\wina20.386
```

► **If you have moved the WINA20.386 file to another directory:**

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. Add a separate line with this command at the end of your CONFIG.SYS file:
`switches=/w`
3. Save your CONFIG.SYS file.
4. Open your Windows SYSTEM.INI file. (You should find this file in your WINDOWS directory.)
5. Find the section in your SYSTEM.INI file that begins with [386Enh].
6. Add this command under the [386Enh] heading:

```
device=[drive:][path]wina20.386
```

The *drive* and *path* parameters specify the new location of the WINA20.386 file.

For example, if you want to move the file to your WINDOWS directory, add this command to your SYSTEM.INI file:

```
device=c:\windows\wina20.386
```

7. Save your SYSTEM.INI file, and quit the text editor.
8. Restart your computer by pressing CTRL+ALT+DEL.

If Windows 3.0 doesn't run in 386 enhanced mode after you have checked the items just listed and you are using EMM386, carry out the following procedure.

► **To determine whether a device is causing the problem:**

1. Use a text editor, such as MS-DOS Editor, to open the SYSTEM.INI file in your WINDOWS directory.
2. Insert the following command in the [386Enh] section of the file:
EMMExclude=a000-ffff
3. Start Windows 3.0.

If Windows 3.0 does not run in 386 enhanced mode, a device is causing the problem.

You receive the “Insufficient space for the MIRROR image file” message

You might receive the following message when you try to format a floppy disk:

```
Drive A error. Insufficient space for the MIRROR image file.  
There was an error creating the format recovery file.  
This disk cannot be unformatted.  
Proceed with Format (Y/N)?
```

Typically, the MS-DOS 5.0 **format** command leaves files on a disk intact and adds a hidden file. This file contains information that MS-DOS 5.0 uses if you later decide to use the **unformat** command. If you try to format a disk that is very full, there might not be enough space for the hidden file. In this case, MS-DOS 5.0 prompts you to decide whether you want to proceed with an irreversible format. If you type **y** to proceed with an irreversible format, you cannot use the **unformat** command with the disk. Type **n** to cancel the irreversible format. After you type **n**, delete a few files from the disk so there is enough room for the hidden file. Then, try formatting the disk again.

Lotus 1-2-3 version 3.1 won't start

This section explains what to do if Lotus 1-2-3 version 3.1 won't start and you are using an 80286 or higher processor with extended-memory (XMS) and an extended memory driver such as HIMEM.SYS.

If Lotus 1-2-3 no longer runs properly or it prevents you from opening large files, there could be several causes:

- You might not have enough XMS memory available. You need at least 384K (393,216 bytes).

- You are using MS-DOS Shell, and Task Swapper is enabled.
- Your expanded-memory emulator (EMM386.EXE) isn't set up to work with Lotus 1-2-3.

Carry out the following procedures in order. If the first procedure doesn't solve the problem, try the next one.

Increasing available extended memory

Before you can make more extended memory available, you must determine how much extended memory is in use.

► To determine how much extended memory is being used:

1. At the command prompt, type the following:
mem
2. The information that appears on your screen will look something like this:

```
651264 bytes total conventional memory
651264 bytes available to MS-DOS
508736 largest executable program size

1556480 bytes total in EMS memory
55706 bytes free EMS memory
4194304 bytes total contiguous extended memory
0 bytes available contiguous extended memory
48576 bytes available XMS memory
MS-DOS resident in High Memory Area
```

The second line from the bottom displays the amount of XMS memory available. In the example, there are only 48,576 bytes free. You need at least 393,216 bytes to run Lotus 1-2-3 version 3.1.

► To make more extended memory available, try the following:

- Make sure your computer has as much physical extended memory as the program needs. If you do not have enough physical extended memory, you may want to contact your hardware vendor to determine how you can add more to your system.
- Make sure your CONFIG.SYS file contains a **device** command for the HIMEM.SYS extended memory manager (or another memory manager that conforms to the XMS specification). Most programs need an extended memory manager to use extended memory. For more information about HIMEM.SYS, see Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*.

- If your CONFIG.SYS file includes a **device** command for SMARTDrive, RAMDrive, or EMM386, these programs could be using too much of your extended memory. If so, reduce the amount of memory specified by editing the **device** command for each driver. For more information about editing the **device** commands in your CONFIG.SYS file, see Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*.
- Make sure your CONFIG.SYS and AUTOEXEC.BAT files don't start unnecessary programs that use extended memory. For more information about streamlining your CONFIG.SYS and AUTOEXEC.BAT files, see Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*.
- If you are using Microsoft Windows 3.0, make sure you specify that 384K of XMS memory is needed in the PIF (program information file) for Lotus 1-2-3. For more information about PIF files, see Chapter 12 of the *Microsoft Windows 3.0 User's Guide*.
- If you are using MS-DOS Shell, create a program item for Lotus 1-2-3, and make sure you specify that 384K of XMS memory is needed in the Advanced Program Item Properties dialog box. For more information about program items and program-item properties, see Chapter 8 of the *Microsoft MS-DOS User's Guide and Reference*.

Running Lotus 1-2-3 version 3.1 with Task Swapper

If you're using MS-DOS Shell and Task Swapper, you might solve problems running Lotus 1-2-3 version 3.1 by making sure enough XMS memory is specified. Before you can specify memory, you must have a program item for Lotus.

NOTE If you don't have a program item for Lotus 1-2-3, see Chapter 8 in the *Microsoft MS-DOS User's Guide and Reference* for instructions on how to create one.

► To find out whether Task Swapper is enabled in MS-DOS Shell:

- Open the Options menu by clicking Options or pressing ALT+O.
If a diamond appears next to Task Swapper on the menu, Task Swapper is active. Make sure you've specified in the Advanced Program Item Properties dialog box that Lotus 1-2-3 needs 384K of XMS memory.
If Task Swapper is not active, your problem with Lotus 1-2-3 might be solved in the next section.

Setting up EMM386.EXE to run Lotus 1-2-3 version 3.1

If none of the previous procedures solved the problem, you may have an 80386 processor with EMM386 set to run with the **noems** switch. This switch makes expanded (EMS) memory unavailable. Because Lotus 1-2-3 version 3.1 and EMM386 both run in protected mode, they need to communicate to avoid conflicts. Lotus and EMM386 can use a protocol called Virtual Control Program Interface (VCPI) to communicate. VCPI requires that a page of expanded memory space exists. A page is not available if EMM386 uses the **noems** switch. Change the setting by carrying out the following procedure.

► To update the device command for EMM386:

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. Locate the **device** command for EMM386. It should look like the following:

```
device=c:\dos\emm386.exe noems
```

If there is no **device** command for EMM386 in your CONFIG.SYS file, add one, as described in the next step. Make sure the line you add appears after the **device** command for HIMEM.SYS.

3. Replace the **noems** switch with the **ram** switch, and add the **p** switch to the **device** command for EMM386.EXE.

The correct **device** command for EMM386 should look like the following:

```
device=c:\dos\emm386.exe ram p0=d000
```

The **ram** switch gives programs access to both expanded memory and the upper memory area. The **p0=d000** setting directs MS-DOS 5.0 to use a page for EMS.

4. Save your CONFIG.SYS file, and quit the text editor.
5. Restart your computer by pressing CTRL+ALT+DEL.

When your computer restarts, you'll be warned that a LIM 3.2-compatible (64K) page frame does not exist. The standard size for a page frame is 64K, but since Lotus 1-2-3 is using XMS memory (not EMS), it only needs a 16K page. This provides more space for programs in UMBs (upper memory blocks).

6. Try starting Lotus 1-2-3 again.

You cannot get device drivers or programs to load into the upper memory area

You have set up your system to run device drivers and programs in the upper memory area, but when you use the **mem /c** command, nothing appears in the upper memory area section of the **mem** command output.

There are several possible causes:

- You are running Microsoft Windows version 3.0 in 386 enhanced mode, and you typed the **mem /c** command from the DOS prompt while Windows was running. The **mem** command does not report the contents of the upper memory area when Windows is running in 386 enhanced mode.
- Your system might not be set up properly to run programs in the upper memory area. To make sure your system is set up properly, see the following section.
- You are starting EMM386 with the **ram** switch, which allows you to use expanded memory. The **ram** switch sets aside 64K of the upper memory area for use as an expanded-memory page frame. This might not leave enough space in the upper memory area to load any programs or device drivers. To solve this problem, see “Adjusting EMM386 to provide more upper memory blocks” later in this section.

Making sure your system is set up to run programs in the upper memory area

You should be able to run programs in the upper memory area if all the following conditions are met:

- Your computer must have an 80386 or higher processor.
- Your computer must have at least 350K of extended memory available.
- Your CONFIG.SYS file must contain a **device** command for HIMEM.SYS. This command must appear before any other **device** or **devicehigh** commands.
- Your CONFIG.SYS file must contain either a **dos=umb** or **dos=high,umb** command.

- Your CONFIG.SYS file must contain a **device** command for EMM386.EXE, which must include either the **noems** switch or the **ram** switch. This command must appear after the **device** command for HIMEM.SYS but before any **devicehigh** commands.
- Your CONFIG.SYS file must contain a **devicehigh** command for each device driver you want to load into the upper memory area.
- Your AUTOEXEC.BAT file must contain a **loadhigh** command for each memory-resident program (TSR) you want to run in the upper memory area.

The following CONFIG.SYS file contains examples of commands that run programs in the upper memory area:

```
device=c:\dos\himem.sys
dos=high,umb
device=c:\dos\emm386.exe ram
devicehigh=c:\util\mydriver.sys
```

For instructions on setting up your system to run programs in the upper memory area, see Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*.

Adjusting EMM386 to provide more upper memory blocks

You can adjust EMM386 so it provides additional space in the upper memory area for use as UMBs. This is particularly useful if you are starting EMM386 by using the **ram** switch. First, carry out Procedure 1. If, after carrying out Procedure 1, you still cannot load programs and device drivers into UMBs, carry out Procedure 2.

► Procedure 1 To allocate additional space for use as UMBs:

1. Create an MS-DOS 5.0 startup (boot) disk. To do so, insert a formatted floppy disk in drive A, and type the following:
sys c: a:
2. Copy your CONFIG.SYS file to the startup disk by typing the following:
copy c:\config.sys a:
3. Use a text editor, such as MS-DOS Editor, to open the CONFIG.SYS file on drive C.

4. Locate the **device** command for EMM386.EXE, and insert the **i** switch in front of the **ram** or the **noems** switch. The **i** switch specifies a range of addresses in the upper memory area and directs EMM386 to allocate that memory for use as UMBs. The value you specify for the **i** switch depends on your computer and monitor type.

- If your computer is not an IBM PS/2 and does not have a monochrome monitor, add the **i=e000–efff** and the **i=b000–b7ff** switches before the **ram** or **noems** switch. For example:

```
device=c:\dos\emm386.exe i=e000-efff i=b000-b7ff ram
```

- If your computer is not a PS/2 and has a monochrome monitor, add the **i=e000–efff** switch before the **ram** or **noems** switch. For example:

```
device=c:\dos\emm386.exe i=e000-efff ram
```

- If your computer is an IBM PS/2 and does not have a monochrome monitor, add the **i=b000–b7ff** switch before the **ram** or **noems** switch. For example:

```
device=c:\dos\emm386.exe i=b000-b7ff ram
```

- If your computer is an IBM PS/2 with a monochrome monitor, see Procedure 2.

5. Save your CONFIG.SYS file, and quit the text editor.

6. Restart your computer by pressing CTRL+ALT+DEL.

If your computer fails when you start it, the memory range you specified for EMM386 is probably being used by hardware or video display drivers. In this case, insert your startup disk in drive A, and restart your computer. Then, open your CONFIG.SYS file, remove the **i** switch(es) you added to the **device** command for EMM386, and save the file. If you are starting EMM386 with the **ram** switch, follow Procedure 2.

7. After your computer starts, check whether your programs were loaded into UMBs successfully. To do so, type the following at the command prompt:

```
mem /c ! more
```

This command displays the contents of your computer's conventional memory and the upper memory area and shows where in memory each program is running. For more information about the **mem** command and UMBs, see Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*.

You have solved the problem if your programs and device drivers are running in UMBs.

If you still cannot load your programs into UMBs, your system might be using much of the upper memory area for hardware code. Some computers use the upper memory area for ROM shadowing, which can improve your computer's speed. (In ROM shadowing, the computer copies hardware code from the slower read-only memory [ROM] into the faster RAM.) To find out more about how your computer uses the upper memory area, see the documentation that came with your system.

If you cannot load programs into UMBs and you are starting EMM386 with the **ram** switch, carry out Procedure 2.

► **Procedure 2 To set aside fewer UMBs for expanded memory:**

NOTE Use this procedure only if your programs use expanded memory according to Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS) version 4.0. Programs that follow LIM EMS version 3.2 need the full 64K page frame and are unable to use expanded memory as described in this procedure.

1. Type the following at the command prompt:

emm386

EMM386 displays information about its current memory-management activities. Locate the line that reads "Page frame segment," and write down the hexadecimal address that appears on that line. In the following example, the page frame segment address is E000h.

```
Page frame segment . . . . . E000 H F
```

2. Use a text editor, such as MS-DOS Editor, to open the CONFIG.SYS file on drive C.
3. Locate the **device** command for EMM386.EXE, and insert the **p0** switch before the **ram** switch. The **p0** switch should specify the address you obtained from EMM386 in step 1. For example, if the page-frame segment was e000h, the **device** command would appear as follows:

```
device=c:\dos\emm386.exe p0=e000 ram
```

4. Save your CONFIG.SYS file, and quit the text editor.

5. Restart your computer by pressing CTRL+ALT+DEL.

If your computer fails when you start it, insert your startup disk in drive A, and restart your computer. Then, open your CONFIG.SYS file, remove the **p0** switch you added to the **device** command for EMM386, and save the file. Restart your computer, and repeat this procedure (Procedure 2). Check the page-frame segment address carefully.

6. After your computer starts, check whether your programs were loaded into UMBs successfully. To do so, type the following at the command prompt:

mem /c ! more

This command displays the contents of your computer's conventional memory and the upper memory area and shows where in memory each program is running. For more information about the **mem /c** command and UMBs, see Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*.

You have solved the problem if your programs and device drivers now run in UMBs.

For more information about running programs and device drivers in the upper memory area, see Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*.

Microsoft Windows 3.0 does not provide expanded memory after EMM386 is installed

This section explains what to do if you have installed EMM386 and Microsoft Windows 3.0 does not provide expanded memory for DOS applications that need it.

The symptoms of this problem vary. Common symptoms include the following:

- When you start a DOS application from within Windows 3.0, the application displays an out-of-memory message and stops running.
- After you start a DOS application from within Windows 3.0, the application behaves erratically and displays out-of-memory messages when you try to perform certain tasks.
- Windows 3.0 stops when you start some DOS applications, but you have no problem starting other DOS applications.

To solve the problem, change the **device** command line for EMM386 so that it includes the **ram** switch instead of the **noems** switch.

► **To change the device command for EMM386:**

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. Locate the **device** command for EMM386.EXE. It should look like the following:

```
device=c:\dos\emm386.exe noems
```
3. Substitute the **ram** switch for the **noems** switch. The **device** command for EMM386 should now look like this:

```
device=c:\dos\emm386.exe ram
```
4. Save your CONFIG.SYS file, and quit the text editor.
5. Restart your computer by pressing CTRL+ALT+DEL.
6. Start Windows 3.0, and try running your DOS application.

If your application runs normally, the **noems** switch caused the problem.

After carrying out this procedure, you might find that some programs or device drivers now fail to load into UMBs. (Use the **mem /c** command to check this.) If your programs or device drivers do not load into UMBs, follow the instructions in “Adjusting EMM386 to provide more upper memory blocks” in the previous section, “You cannot get device drivers or programs to load into the upper memory area.”

You have solved the problem if your programs and device drivers are running in UMBs, and your DOS application still works properly and is receiving the expanded memory it needs.

If your programs and device drivers still do not load into UMBs, your system may not have enough UMBs available to run those programs. See your computer’s hardware documentation for information about which addresses in the upper memory area are in use.

For more information about EMM386.EXE and its startup parameters, see Chapter 15 of the *Microsoft MS-DOS User’s Guide and Reference*.

For more information about how to use program information files (PIFs) to provide expanded memory to DOS applications, see the *Microsoft Windows 3.0 User’s Guide*.

You accidentally delete an MS-DOS 5.0 file

If you inadvertently delete an MS-DOS 5.0 file that you need, there are three ways to retrieve it:

- Use the **undelete** command.

The **undelete** command can retrieve a deleted MS-DOS 5.0 file. However, the **undelete** command might not work if you use your disk after you delete the file you want to retrieve.

- If you set up MS-DOS 5.0 on floppy disks, you can copy the MS-DOS 5.0 file from the floppy disks to your hard disk. Open the PACKING.LST file to determine the contents of each floppy disk. (The PACKING.LST file is in the directory on your hard disk that contains your MS-DOS 5.0 files.) Then, use the **copy** command to copy the file from the floppy disk to your hard disk.
- Expand and copy the file from a Setup disk.

If you did not set up MS-DOS 5.0 on floppy disks, you can use the **expand** command to expand and copy the file from the Setup disks. Most of the files on the Setup disks are compressed. An underscore (_) at the end of the filename extension identifies a compressed file (for example, SORT.EX_). For information about the location of a file on the Setup disks, see the Appendix, "Contents of the Setup Disks."

► To retrieve a compressed file from a Setup disk:

1. See the Appendix, "Contents of the Setup Disks," to determine which Setup disk contains the file you need.
2. Insert the appropriate disk in a disk drive, and make that drive current.
3. Use the **expand** command to expand and copy the compressed file from the Setup disk to the directory that contains your MS-DOS 5.0 files.

For example, to expand and copy the DOSKEY.CO_ file from drive A to the C:\DOS directory, type:

```
expand a:\doskey.co_ c:\dos\doskey.com
```

Make sure you give the expanded file the proper filename and extension. If you're not sure of the correct extension, see the Appendix.

NOTE If you accidentally delete the EXPAND.EXE file, you can retrieve it from the Setup disks by using the **copy** command. The EXPAND.EXE file is not compressed. Check the Appendix, "Contents of the Setup Disks," to determine which Setup disk contains the EXPAND.EXE file.

For more information about the **undelete**, **copy**, and **expand** commands, see Chapter 14 of the *Microsoft MS-DOS User's Guide and Reference*.

The undelete command doesn't work

It is probably too late to save a file by using the **undelete** command if you have used your disk since deleting the file.

In general, the **undelete** command works best under the following circumstances:

- Use **undelete** immediately after you delete a file.
- Use Mirror, a memory-resident program that keeps track of certain changes you make to your hard or floppy disks.

CAUTION Never run a disk-compaction program (defragmentation utility) after deleting files you may want to restore. The **undelete** command cannot restore files that were deleted before you ran the disk-compaction program.

You upgraded your monitor, but it doesn't work properly with MS-DOS Shell

If you change the type of monitor you use, you need to manually install files so MS-DOS Shell can take advantage of the capabilities of the new monitor. For more information, see "Incorrect or corrupt MS-DOS Shell files" in the section "MS-DOS Shell won't start or switch between programs" earlier in this chapter.

The restore command doesn't work

The **backup** command is designed to back up files or directories for safekeeping. The **restore** command is designed to restore those files and directories on the same computer and with the same version of DOS.

The **restore** command might not restore files you backed up by using the **backup** command if:

- You try to restore files to a different directory.
The **restore** command restores files only to the directory from which files were backed up. For example, you cannot restore files backed up from C:\WORD to

a directory named C:\OLDWORD. (However, you can change the drive letter. For example, you can restore files backed up from C:\WORD to the D:\WORD directory.)

- You try to restore a file to a different filename.

You cannot rename a file while using the **restore** command. For example, if you back up a file named REPORT.TXT, you cannot restore it to a file named MYREPORT.TXT.

- The **restore** command is not compatible with the **backup** command you used to back up the files.

The **restore** command supplied with MS-DOS 5.0 can restore files you backed up by using the **backup** command from MS-DOS version 2.0 or later.

If you backed up files by using the **backup** command in MS-DOS 5.0, you must use the **restore** command from MS-DOS version 3.3 or later to restore them.

To restore a complete hard disk from a backup disk (or disks) in drive A, type the following command:

```
restore a: c:\*.* /s
```

For more information about the **backup** and **restore** commands, see Chapter 14 of the *Microsoft MS-DOS User's Guide and Reference*.

You receive the "Cannot find file QBASIC.EXE" message when you start MS-DOS Editor

If MS-DOS displays the message "Cannot find file QBASIC.EXE" when you try to run MS-DOS Editor, make sure the QBASIC.EXE file is in your DOS directory. This file is required to run MS-DOS Editor. If QBASIC.EXE is not on your disk, copy it from the Setup disks by using the **expand** command. For more information about copying a file from your Setup disks, see the section "You accidentally delete an MS-DOS file" earlier in this chapter.

You cannot print the contents of the screen

If you press SHIFT+PRINT SCREEN but the graphic image on your screen doesn't print, make sure the Graphics program is running.

To determine whether you are running Graphics, type **mem /c**. If Graphics is in the Name column, Graphics is running. If not, type **graphics** at the command prompt, or add the **graphics** command to your AUTOEXEC.BAT file, and restart your computer.

NOTE The PRINT SCREEN key is disabled by some network software. Also, you cannot print to a PostScript printer by using SHIFT+PRINT SCREEN.

The rest of this section explains what to do if you are running Graphics, you try to print the contents of your screen, and one of the following happens:

- Your computer stops.
- The printer prints unintelligible characters.
- You receive the "Stack overflow" message.
- Nothing is printed.

► To print the contents of a screen by using the Graphics program:

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. Look for a command that begins with **stacks=**.
3. If the file contains a **stacks** command, change it to the following:

```
stacks=9,256
```

If the file does not contain a **stacks** command, add the preceding command to the file.
4. Save your CONFIG.SYS file, and quit the text editor.
5. Restart your computer by pressing CTRL+ALT+DEL.
6. To find out whether your AUTOEXEC.BAT file loads the Graphics program when you start your computer, type **mem /c** at the command prompt. If Graphics is in the Name column, Graphics is running. If the command is not running, type **graphics** at the command prompt.

7. Try printing a screen image.
8. If you still cannot print the image, change the **stacks** command to:
`stacks=18,256`
9. Restart your computer.
10. If the **graphics** command is not in your AUTOEXEC.BAT file, type **graphics** at the command prompt.
11. Try printing a screen image again.

If you still cannot print a screen image, and you are using a Hewlett-Packard printer, try the following procedure.

► **If you're using a Hewlett-Packard printer:**

1. Include the **laserjet** option in your **graphics** command.
To do this, type **graphics laserjet** at the command prompt. Or, if you start Graphics from your AUTOEXEC.BAT file, open the file, and add **laserjet** to the **graphics** command.
Use the **laserjet** option, no matter what type of Hewlett-Packard printer you have.
2. Restart your computer by pressing CTRL+ALT+DEL.
3. Try printing a screen image.
4. If you still cannot print a screen image, try using the **graphics laserjetii** command instead of **graphics laserjet**.

If you still cannot print a screen image, you might be running a memory-resident program that conflicts with Graphics. To find out whether this is the problem, disable all your memory-resident programs except Graphics.

► **To disable your memory-resident programs:**

1. Disable your AUTOEXEC.BAT and CONFIG.SYS files by typing the following commands:
`ren c:\autoexec.bat autoexec.bak`
`ren c:\config.sys config.bak`
2. Restart your computer by pressing CTRL+ALT+DEL.
3. Connect to your printer.
4. Type **graphics** at the command prompt.

5. Try printing the screen image again.
If you can print a screen image, the Graphics program is not causing the problem.
6. Type the following to reenable your AUTOEXEC.BAT and CONFIG.SYS files:

```
ren c:\autoexec.bak autoexec.bat  
ren c:\config.bak config.sys
```
7. Restart your computer by pressing CTRL+ALT+DEL.

You cannot print a document

This section explains what to do if you could print before upgrading to MS-DOS 5.0 but now cannot. When you try to print, one of the following occurs:

- Your computer stops.
- You receive an error message, such as one of the following:
Write fault error writing to device PRN Abort, Retry ?
Not ready error writing to device PRN Abort, Retry, Ignore ?

► To reenable your printer:

1. Insert Setup Disk 2 (5.25-inch disks) or Setup Disk 3 (3.5-inch disks) in a floppy disk drive, and make that drive current.
2. Type the following at the command prompt:

```
copy a:\printfix.com c:\dos
```
3. Use a text editor, such as MS-DOS Editor, to open your AUTOEXEC.BAT file.
4. Type **printfix** on a separate line in your AUTOEXEC.BAT file.
5. Save your file, and quit the text editor.
6. Quit any programs that are running, and restart your computer.

Your keyboard doesn't work with a program

Your keyboard might not work with some programs unless you add the **switches=/k** command to your CONFIG.SYS file, and the **/k** switch to the **device** command for ANSI.SYS, if you have one.

► To add the switches=/k command or the /k switch:

1. If you cannot quit the program, restart your computer by pressing CTRL+ALT+DEL.
2. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
3. Add the following command to your CONFIG.SYS file:
switches=/k
4. If you have a **device** command that starts ANSI.SYS, add the **/k** switch at the end of that command, too. The command should look like the following:
`device=c:\dos\ansi.sys /k`
5. Save the file, and quit the text editor.
6. Restart your computer by pressing CTRL+ALT+DEL.

Chapter 4

Common Questions About MS-DOS 5.0

4

This chapter answers some of the most common questions users have as they set up and use MS-DOS 5.0.

Many of the procedures outlined in the chapter require you to modify files, such as your CONFIG.SYS or AUTOEXEC.BAT file, by using a text editor. MS-DOS 5.0 includes a full-screen, menu-driven text editor that was designed for this purpose. For information about how to use MS-DOS Editor, see Chapter 9 of the *Microsoft MS-DOS User's Guide and Reference*.

If you prefer to use a word-processing program, such as WordPerfect or Microsoft Word, be sure to save the file as an unformatted, or ASCII, text file. Your computer may fail if you save your CONFIG.SYS or AUTOEXEC.BAT file in your word processor's format.

CAUTION Be careful when editing your CONFIG.SYS and AUTOEXEC.BAT files. Your computer runs these files every time you start your system. They provide important information, such as which device drivers to install, how MS-DOS uses memory and controls files, and the search path you want MS-DOS to use. Also, be careful when editing files whose filename extension is .INI. These files provide important information about how to configure specific programs.

Be sure to make a backup copy of your CONFIG.SYS and AUTOEXEC.BAT files before you begin editing the originals.

Can I set up MS-DOS 5.0 on floppy disks?

Yes. For more information about creating these disks, see Chapter 2, "Installing MS-DOS 5.0."

Which Microsoft device drivers should I use?

MS-DOS 5.0 includes several device drivers that you load by using the **device** command in your CONFIG.SYS file. Other Microsoft products also include some of these device drivers.

For example, the following device drivers are supplied with MS-DOS 5.0 and Microsoft Windows 3.0:

- HIMEM
- RAMDrive
- SMARTDrive
- EMM386

These are general-purpose device drivers that are updated periodically. Check the creation date on these files, and use the most recent version available.

For more information about these and other device drivers, see Chapter 15 of the *Microsoft MS-DOS User's Guide and Reference*.

What is the maximum length of the PATH command line?

The PATH command line, like command lines for other environment variables, is limited to 127 characters.

You use the **path** command to set your PATH variable to one or more directories. Whenever you type a command, MS-DOS 5.0 searches the directories in the path for the command or program you are trying to run. The following is an example of a **path** command:

```
path=c:\;c:\dos;c:\windows;d:\batfiles;d:\util
```

Path= takes up 5 of the 127 characters. This means you can use 122 characters to specify directory names. To use those 122 characters most efficiently:

- Remove any spaces from the **path** command.
- Remove seldom-used directories from the **path** command.
- Use short directory names.

- Use batch programs to set and reset the path according to your current needs.
- Make sure directory names appear in the path only once.
- Use the **subst** command to substitute a drive letter for a long directory path, if necessary.

With the **subst** command, you can use a drive letter instead of a full path. You can use the **subst** command in your AUTOEXEC.BAT file.

For example, to shorten a path named C:\USER\MAESTAS\FRANK to Q:, you would include the following command (before the **path** command) in your AUTOEXEC.BAT file:

```
subst q: c:\user\maestas\frank
```

Do not use the **subst** command if you are using Microsoft Windows.

For more information about the **path** and **subst** commands, see Chapter 14 of the *Microsoft MS-DOS User's Guide and Reference*.

How can I increase the environment size?

The environment size you specify in your CONFIG.SYS file determines how much memory is set aside for all of your environment variables, such as PATH and TEMP.

You can increase the environment size by specifying the **/e** switch with the **command** command. The default environment size is 256 bytes. For example, suppose you add the following command to your CONFIG.SYS file:

```
shell=c:\command.com /p /e:1024
```

The size of the new environment will be 1024 bytes, or the size of the current environment, whichever is greater.

For more information about the **command** command, see Chapter 14 of the *Microsoft MS-DOS User's Guide and Reference*.

How do I get MS-DOS to run in the high memory area?

MS-DOS 5.0 can conserve memory by loading itself into the first 64K of extended memory, known as the *high memory area* (HMA). However, under certain conditions, MS-DOS 5.0 will not load into the HMA.

What are the prerequisites for loading MS-DOS 5.0 into the HMA?

MS-DOS 5.0 can load itself into the HMA if all of the following conditions are met:

- Your computer has an 80286 or higher processor.
- Your computer has extended memory (MS-DOS 5.0 cannot load into expanded memory).
- Your CONFIG.SYS file contains a **device** command for HIMEM.SYS or an equivalent extended memory manager. For details, see “What should I do if MS-DOS 5.0 won’t load into the HMA?” later in this section.
- Your CONFIG.SYS file contains either a **dos=high** or **dos=high, umb** command. The **dos** command should appear after the **device** command for HIMEM.SYS and before any other **device** commands. For details, see “What should I do if MS-DOS 5.0 won’t load into the HMA?” later in this section.

How do I find out whether MS-DOS 5.0 has successfully loaded into the HMA?

To find out whether MS-DOS 5.0 has loaded into the HMA, type the following at the command prompt:

mem

MS-DOS 5.0 displays information about your system’s memory. If the last line of the display reads “MS-DOS resident in High Memory Area,” MS-DOS 5.0 has successfully loaded into the HMA.

What should I do if MS-DOS 5.0 won’t load into the HMA?

If MS-DOS 5.0 fails to load into the high memory area, carry out the following procedures in order.

► **Procedure 1 To meet the prerequisites for loading MS-DOS into the HMA:**

1. Make sure your system has an 80286 or higher processor.
2. Make sure your computer has extended memory. To find out if your computer has extended memory, type the following at the command prompt:
mem
The **mem** command reports the type and amount of memory that your computer has.
3. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
4. Make sure your CONFIG.SYS file contains a **device** command for HIMEM.SYS. If the file doesn't contain one, insert the following line at the beginning of the file:
device=c:\dos\himem.sys
5. Make sure your CONFIG.SYS file contains a **dos=high** command or a **dos=high, umb** command. If the file doesn't contain one of these commands, insert the following line:
dos=high
6. Save the CONFIG.SYS file, and quit the text editor.
7. Restart your computer by pressing CTRL+ALT+DEL.
8. Use the **mem** command to find out whether MS-DOS 5.0 has loaded successfully into the HMA. If MS-DOS has failed to load into the HMA, carry out the next procedure.

► **Procedure 2 To add the /cpuclock switch to HIMEM.SYS:**

1. Create an MS-DOS startup (boot) disk. To do so, insert a formatted floppy disk in drive A, and type the following:
sys c: a:
2. Copy your CONFIG.SYS file to the startup disk by typing the following:
copy c:\config.sys a:
3. Use a text editor, such as MS-DOS Editor, to open the CONFIG.SYS file on drive C.
4. Locate the **device** command for HIMEM.SYS, and add the **/cpuclock:on** switch to it. The command should now appear as follows:
device=c:\dos\himem.sys /cpuclock:on

5. Save your CONFIG.SYS file, and quit the text editor.
6. Restart your computer by pressing CTRL+ALT+DEL.
7. Use the **mem** command to find out whether MS-DOS 5.0 has loaded successfully into the HMA. If MS-DOS 5.0 fails to load into the HMA, carry out the next procedure.

► **Procedure 3 To add the /machine switch to HIMEM.SYS:**

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. Locate the **device** command for HIMEM.SYS, and add the **/machine** switch to it.

The **/machine** switch specifies the type of computer you have. The switch should be followed by a colon (:) and your machine number (see the table following this procedure). For example, the following **device** command specifies that your computer is a Toshiba 5100 (machine number 7):

```
device=c:\dos\himem.sys /cpuclock:on /machine:7
```

3. Save your CONFIG.SYS file, and quit the text editor.
4. Restart your computer by pressing CTRL+ALT+DEL.

If your computer fails when you restart it or you see the “ERROR: Cannot control A20 line” message, the machine number you specified is incorrect for your hardware. In this case, insert the startup disk in drive A, and restart your system. Then, open your CONFIG.SYS file, specify a different machine number, save your changes, and restart your system. You might need to try several machine numbers before you identify the one that works for your computer.

5. After your computer starts, use the **mem** command to find out whether MS-DOS loaded into the HMA. If it did not, repeat this procedure, and specify a different machine number.

The following table lists machine types in alphabetic order and shows the corresponding number you should specify with the **/machine** switch.

Machine Type	Number
Acer 1100	6
AT&T 6300 Plus	5
Bull Micral 60	16
COMPUADD 386 systems	1 or 8
CSS Labs	12
Datamedia 386/486	2
Hitachi HL500C	8
HP Vectra	14
HP Vectra (A and A+)	4
IBM PC/AT	1
IBM PC/AT	11
IBM PC/AT (alternative delay)	12
IBM PC/AT (alternative delay)	13
IBM PS/2	2
Intel 301z or 302	8
JDR 386/33	1
Philips	13
Phoenix Cascade BIOS	3, 1, or 8
Toshiba 1600 and 1200XE	7
Toshiba 5100	7
Tulip SX	9
UNISYS PowerPort	2
Wyse 12.5 MHz 286	8
Zenith ZBIOS	10

If your computer is not on the list, or you are not sure which number to use, try machine numbers in the following order: 1, 11, 12, 13, 8, 2–10, 14–16.

For additional information, see Chapters 12 and 15 of the *Microsoft MS-DOS User's Guide and Reference*.

How can I get both expanded and extended memory on my computer?

This section describes how to configure your system to provide both expanded and extended memory. This may be necessary if you have some programs that need expanded memory and others that need extended memory. Or, you have programs that need expanded memory, but you also want to run MS-DOS 5.0 in the high memory area (which is part of extended memory).

The method you use to allocate memory will differ, depending on the type of computer you have. See the section that applies to your computer.

8086 and 8088 systems

If your computer has an 8086 or 8088 processor, you can use only expanded memory. Neither the 8086 nor the 8088 processor supports extended memory. (To set up your computer so programs can use the memory on your expanded-memory board, see the documentation that came with your memory board.)

80286 systems

If your computer has an 80286 processor, it supports both expanded and extended memory. Many 80286 computers have 384K of built-in extended memory. Others have an add-in memory board. Add-in memory boards can contain expanded or extended memory.

If your 80286 computer has an add-in memory board, you might be able to configure the memory board so it provides both expanded and extended memory. For information about configuring your memory board, see the documentation that came with it.

If your computer's memory board can provide both expanded and extended memory, carry out the following procedure.

► To provide expanded and extended memory on an 80286 system:

1. Configure your memory board so it provides as much expanded memory as your program requires. (See your program's documentation for information about its memory requirements.) Leave any remaining memory as extended. (For information about reconfiguring your memory board, see the documentation that came with it.)

2. Create an MS-DOS 5.0 startup (boot) disk. To do so, insert a formatted floppy disk in drive A, and type the following:
sys c: a:
3. Copy your CONFIG.SYS file to the startup disk by typing the following:
copy c:\config.sys a:
4. Use a text editor, such as MS-DOS Editor, to open the CONFIG.SYS file on drive C.
5. Make sure your CONFIG.SYS file contains a **device** command for your memory board's memory manager. The command should appear before the **device** command for HIMEM.SYS. (See your memory board's documentation for information about installing its memory manager.)
6. Make sure your CONFIG.SYS file contains a **device** command for HIMEM.SYS. The command should appear after the **device** command for your memory board's device driver but before any other **device** commands. The **device** command for HIMEM.SYS should look like the following:
device=c:\dos\himem.sys
7. If you want MS-DOS 5.0 to load itself into the high memory area, make sure your CONFIG.SYS file contains a **dos=high** command. If the file doesn't contain this command, insert the following anywhere in the CONFIG.SYS file:
dos=high
8. Save your CONFIG.SYS file, and quit the text editor.
9. Restart your computer by pressing CTRL+ALT+DEL.
If your computer fails when you restart it, your expanded memory manager might be incompatible with HIMEM.SYS. To get your system running again, insert the startup disk in drive A, and restart your system. Then, copy your backup CONFIG.SYS file to drive C by typing the following:
copy a:\config.sys c:
10. Use the **mem** command to make sure that both expanded (EMS) and extended (XMS) memory are available. (For information about interpreting output from the **mem** command, see Chapter 14 of the *Microsoft MS-DOS User's Guide and Reference*.)

80386 and 80486 systems

If your computer has an 80386 or 80486 processor, it supports both expanded and extended memory. Most 80386 and 80486 computers come with 1 MB or more of extended memory. The EMM386 device driver, which comes with MS-DOS 5.0, can use a portion of your computer's extended memory to emulate expanded memory. Other programs can still use the remaining extended memory.

To configure your 80386 or 80486 system so it provides both extended and expanded memory, carry out the following procedure:

► To provide expanded and extended memory on 80386 and 80486 systems:

1. If your memory board can be configured as expanded or extended memory, configure the board so it provides all extended memory. (To reconfigure your memory board, follow the instructions in the documentation that came with it.)
2. Create an MS-DOS 5.0 startup (boot) disk. To do so, insert a formatted floppy disk in drive A, and type the following:

```
sys c: a:
```

3. Copy your CONFIG.SYS file to the startup disk by typing the following:

```
copy c:\config.sys a:\
```
4. Use a text editor, such as MS-DOS Editor, to open the CONFIG.SYS file on drive C.
5. Make sure your CONFIG.SYS file contains a **device** command for HIMEM.SYS. The command should appear before any other **device** commands and should look like the following:

```
device=c:\dos\himem.sys
```

6. Add a **device** command for EMM386.EXE. The command specifies the location of the EMM386.EXE file, specifies that you want EMM386 to emulate expanded memory, and indicates the amount of extended memory to allocate to EMM386. EMM386 then provides that amount of expanded memory to programs that need it.

The following **device** command specifies that EMM386 should use 640K of extended memory to emulate expanded memory:

```
device=c:\dos\emm386.exe 640
```

If you want to run programs in the upper memory area, add the **ram** switch to the **device** command. The following command specifies that EMM386 should

provide 640K of emulated expanded memory and should also provide access to upper memory blocks (UMBs):

```
device=c:\dos\emm386.exe 640 ram
```

Do not use the **noems** switch; this switch disables all support for expanded memory.

7. If you want MS-DOS 5.0 to load itself into the high memory area, make sure your CONFIG.SYS file contains a **dos=high** command or **dos=high,umb** command. If the file doesn't contain one of these commands, insert the following line after the **device** command for HIMEM.SYS:
dos=high,umb
8. Save your CONFIG.SYS file, and quit the text editor.
9. Restart your computer by pressing CTRL+ALT+DEL.
10. Use the **mem** command to make sure that both expanded (EMS) and extended (XMS) memory are available. For information about interpreting output from the **mem** command, see Chapter 14 of the *Microsoft MS-DOS User's Guide and Reference*.

Example

Suppose you have an 80386 computer with 2 MB of extended memory that you want to configure as follows:

- 512K of expanded memory for your word-processing program
- 1024K of extended memory for the SMARTDrive disk cache
- As much free conventional memory as possible

Your CONFIG.SYS file would contain the following commands:

```
device=c:\dos\himem.sys
device=c:\dos\emm386.exe 512 ram
dos=high,umb
devicehigh=c:\dos\smartdrv.sys 1024
```

The first **device** command loads HIMEM.SYS, which provides access to your computer's extended memory. The next **device** command loads EMM386.EXE, which provides 512K of expanded memory for your word processor. The **ram** switch instructs EMM386.EXE to also provide access to the upper memory area. The **dos** command loads MS-DOS 5.0 into the high memory area and specifies

that you want to be able to load programs into upper memory blocks (UMBs). The **devicehigh** command loads SMARTDrive into the high memory area and creates a 1024K cache in extended memory. With this CONFIG.SYS file, there should be about 512K of extended memory left over.

How do I optimize the use of the upper memory area?

This section explains how to run as many programs and device drivers in the upper memory area as possible. It assumes that you have set up your computer to load programs or device drivers into upper memory blocks (UMBs).

You should be familiar with the information in the section “Running Programs in the Upper Memory Area” in Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*, which explains how to load programs into UMBs.

This section explains the following optimizing techniques:

- Starting EMM386 with the **noems** switch instead of the **ram** switch
- Finding the best order for loading drivers and programs into UMBs
- Adjusting EMM386 to provide more UMBs

Starting EMM386 with the noems switch

If you do not use programs that require expanded memory (EMS), start EMM386 with the **noems** switch. Doing so can give you an additional 64K of UMBs, because the **noems** switch instructs EMM386 not to create an EMS page frame in the upper memory area. If you start EMM386 with the **noems** switch, programs will be unable to use expanded memory, even when they are running with Microsoft Windows.

► To start EMM386 with the noems switch:

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. Find the **device** command that starts EMM386. If the **device** command includes the **ram** switch, change it so it includes the **noems** switch instead. The **device** command for EMM386 should now look like the following:

```
device=c:\dos\emm386.exe noems
```
3. If you made changes to your CONFIG.SYS file, save it, and quit the text editor.
4. Restart your system by pressing CTRL+ALT+DEL.

After you complete this procedure, some programs might display out-of-memory messages or fail to run. Such programs might require expanded memory. If this is the case, replace the **noems** switch with the **ram** switch to make expanded memory available again.

Finding the best order for loading drivers and programs into UMBs

When you start a program by using the **devicehigh** or **loadhigh** command, MS-DOS 5.0 loads that program into the largest remaining UMB, even if it would fit into a smaller UMB. Because of this, the order in which you load programs into UMBs is important when you try to optimize your use of the upper memory area. You will need to experiment to find the best load order for your system.

Creating a startup disk

Before you start optimizing, create a startup (boot) disk that contains a backup copy of your CONFIG.SYS and AUTOEXEC.BAT files. To do so, insert a formatted floppy disk in drive A, and type the following commands:

```
sys c: a:
copy c:\config.sys a:\
copy c:\autoexec.bat a:\
```

Having this startup disk will enable you to experiment more freely. If you change your CONFIG.SYS or AUTOEXEC.BAT file and your computer stops after you restart it, just insert the startup disk in drive A, and press CTRL+ALT+DEL.

Finding the best load order

In general, when loading programs into the upper memory area, load larger programs before smaller ones. However, this simple load-the-biggest-first method might not always be the most efficient. Sometimes, you need to experiment with different load orders to get the most out of the upper memory area.

For example, suppose you want to load the following three programs into UMBs:

PROGRAM1.EXE	2K
PROGRAM2.EXE	2K
PROGRAM3.EXE	3K

Suppose you have two UMBs available; one is 4K in size, the other is 3K in size. (You can find out the sizes of individual UMBs by typing the **mem /p** command at the command prompt. For more information, see Chapter 14 of the *Microsoft MS-DOS User's Guide and Reference*.)

If you load the largest program (PROGRAM3) first, MS-DOS 5.0 puts it into the largest UMB (4K). Since PROGRAM3 doesn't use the entire 4K of space in that UMB, an additional kilobyte of memory is left unused. The next program, PROGRAM1 (2K), fits into the 3K UMB, again leaving an unused kilobyte of memory. However, PROGRAM2 also needs 2K of contiguous space and will not fit into either of the 1K UMBs that remain. In this case, it's not as efficient to load the largest program first.

A more efficient method would be to load PROGRAM1 (2K), then PROGRAM3 (3K), and then PROGRAM2 (2K). MS-DOS 5.0 would load PROGRAM1 into the 4K UMB, leaving 2K of space. PROGRAM3 would then fit into the next largest UMB (3K), and PROGRAM2 would fit into the 2K remaining.

Figuring out a program's memory requirements

How and when a program allocates memory determines what size UMB it needs. In general, programs fall into one of two groups:

- Most programs need a UMB that is at least as large as the program's size while it is running.
To find out this size, type the **mem /c** command at the command prompt while the program is running. In most cases, if there is a UMB of that size available, the program should fit into that UMB.
- Some programs need a UMB that is at least as large as the program's file size.
Such programs use a lot of memory during startup and require less memory once they are running. Such a program initially needs a large UMB, but after it has started, the program relinquishes some memory, which can then be used to load the next program.

The following table lists some common Microsoft device drivers and memory-resident programs that can run in the upper memory area. The table specifies whether a program's file size, or its size while running, determines the size of the UMB it needs.

Program name	Size of UMB needed
ANSI.SYS	File size
APPEND.EXE	Size while running
ASSIGN.COM	Size while running
DISPLAY.SYS	Size while running
DOSKEY.COM	Size while running
DRIVER.SYS	File size
EGA.SYS	File size
FASTOPEN.EXE	Size while running
GRAFTABL.COM	File size
GRAPHICS.COM	Size while running
KEYB.COM	File size
MIRROR.COM	Size while running
MOUSE.COM	File size
MOUSE.SYS	File size
NLSFUNC.EXE	File size
PRINTER.SYS	Size while running
RAMDRIVE.SYS	Size while running
SETVER.EXE	File size
SHARE.EXE	Size while running
SMARTDRIVE.SYS	Size while running

Distributing the load order between your CONFIG.SYS and AUTOEXEC.BAT files

Most device drivers are loaded from your CONFIG.SYS file, and most memory-resident programs from your AUTOEXEC.BAT file. MS-DOS 5.0 processes your CONFIG.SYS file first and then carries out the commands in your AUTOEXEC.BAT file. This limits your ability to manipulate the load order of your device drivers and programs because the device drivers in your CONFIG.SYS file will always load before the programs in your AUTOEXEC.BAT file do.

The following tips can help you balance the use of UMBs between device drivers and memory-resident programs:

- In your CONFIG.SYS file, start only the largest device drivers by using the **devicehigh** command. If you use device drivers that are smaller than the largest memory-resident programs that load from your AUTOEXEC.BAT file, start those drivers by using the **device** command. (Also, use the **device** command to load the HIMEM.SYS and EMM386.EXE files. You cannot run these drivers in UMBs.)
- In your AUTOEXEC.BAT file, start your largest memory-resident programs by using the **loadhigh** command.
- If your mouse comes with both a MOUSE.SYS and MOUSE.COM file, you can start your mouse driver from either your CONFIG.SYS or AUTOEXEC.BAT file. This way, you can load the mouse driver at any point in the startup process (as long as you load it after HIMEM.SYS and EMM386.EXE are loaded).
- To load the mouse driver into UMBs from your CONFIG.SYS file, use the **devicehigh** command to load the MOUSE.SYS file.
- To load the mouse driver into UMBs from your AUTOEXEC.BAT file, use the **loadhigh** command to load the MOUSE.COM file.

Adjusting EMM386 to provide more UMBs

You can adjust EMM386 to allocate additional space in the upper memory area. This is particularly useful if you have to start EMM386 with the **ram** switch to make expanded memory available to programs.

Follow the procedures in the section “Adjusting EMM386 to provide more upper memory blocks” in “You cannot get device drivers or programs to load into the upper memory area,” in Chapter 3, “Troubleshooting.”

What is the setver command and how can I use it?

Some programs check which version of DOS is running when they start. Such a program may not run unless the version MS-DOS reports to it is the one the program was designed for. For example, a program designed for MS-DOS version

3.3 may not start if you are running MS-DOS version 5.0. Instead, it will display a message such as the following:

Incorrect DOS version

If you receive this message, there are two possible problems:

- The program is not compatible with MS-DOS 5.0.
- The program is compatible, but will not run unless it interprets MS-DOS version 5.0 as the version of DOS that it was designed for.

CAUTION Contact your software vendor for information about whether a specific program works with MS-DOS 5.0. It is possible that Microsoft has not verified whether the program will successfully run if you use the **setver** command to change the version table. If you run the program after changing the version table, you may lose or corrupt data or introduce system instabilities. Microsoft is not responsible for any loss or damage, or for lost or corrupted data.

How do I add a program to the version table?

If the program is compatible, you can “fool” it into running by adding it to the version table. The version table is a list of programs that need MS-DOS to report a version number other than 5.0. MS-DOS maintains the version table in a file called SETVER.EXE, which is in your DOS directory.

Use the **setver** command to add a program to the version table. Use the following syntax for the **setver** command:

setver *filename n.nn*

The *filename* parameter is the name of the program file, including its extension. You do not need to include the drive or path of the file. The *n.nn* parameter is the version number you want to report.

For example, suppose you have a program called EASYEDIT.EXE, which requires MS-DOS to report version 3.31. You would type the following command at the command prompt to add EASYEDIT.EXE to the version table:

```
setver easyedit.exe 3.31
```

In addition, you must have the **device=c:\dos\setver.exe** command in your CONFIG.SYS file. Usually, Setup adds this command when you install MS-DOS 5.0. This command loads the SETVER.EXE file (which contains the version table) each time you start your computer.

You must restart your computer by pressing CTRL+ALT+DEL before any changes you made to the version table can take effect.

NOTE Make sure you have only one SETVER.EXE file on your hard disk. Each SETVER.EXE file contains a unique version table. If you have multiple version tables, **setver** might not report the correct version number to a program.

How do I determine which version to specify?

Check the documentation that came with the program to find out which version of DOS it was designed for. If you cannot find this information, ask your vendor.

How do I display the contents of the version table?

To display the complete list of programs in the version table, type the following at the command prompt:

```
setver
```

MS-DOS 5.0 Setup adds several programs and device drivers to the version table. Even if you haven't added any programs to the version table yourself, you will see a list when you type the command.

How do I remove a program from the version table?

You might need to remove a program from the version table if you install an updated version of it. You can do this by using the **/d** switch with the **setver** command.

For example, to remove the EASYEDIT.EXE program from the version table, you would type the following command:

```
setver easyedit.exe /d
```

You must restart your computer by pressing CTRL+ALT+DEL for the change to take effect. After you restart your computer, MS-DOS will report to the program that MS-DOS version 5.0 is running.

Does the `setver` command make an incompatible program run with MS-DOS 5.0?

No. The `setver` command does not affect the compatibility of programs. The command works only for programs that are already compatible with MS-DOS 5.0 but need to be sent a different version number.

If a program is incompatible, request an updated version of it from your vendor.

Do I need a device command for `setver` in my `CONFIG.SYS` file?

MS-DOS 5.0 does not load the version table into memory unless you have the following command in your `CONFIG.SYS` file:

```
device=c:\dos\setver.exe
```

If you disable or remove this command from your `CONFIG.SYS` file, MS-DOS 5.0 will not use the version table.

For more information about the `setver` command, see Chapter 14 of the *Microsoft MS-DOS User's Guide and Reference*.

What is the `WINA20.386` file?

The `WINA20.386` file is a read-only file that is copied to your root directory when you set up MS-DOS 5.0 on a computer that is capable of running Microsoft Windows 3.0 in 386 enhanced mode. Windows 3.0 will not run in 386 enhanced mode without this file. You do not need the `WINA20.386` file if you run any other version of Windows or if you do not run Windows 3.0 in 386 enhanced mode. For a discussion of 386 enhanced, standard, and real modes in Windows, see the *Microsoft Windows 3.0 User's Guide*.

How can I tell if I need the `WINA20.386` file?

If you do not have this file and try to run Windows 3.0 in 386 enhanced mode, the following message appears:

```
You must have the file WINA20.386 in the root of your boot drive  
to run Windows in Enhanced Mode
```

If you see this message, use the **expand** command to expand the compressed file, and copy it from your MS-DOS 5.0 Setup disks to the root directory of your startup (boot) drive. The file is on Setup Disk 2 (5.25-inch disks) or Setup Disk 3 (3.5-inch disks) .

For example, if the WINA20.38_ file is on a disk in drive A and your computer starts from drive C, type the following at the command prompt:

```
expand a:\wina20.38_ c:\wina20.386
```

Can I delete the WINA20.386 file?

You can delete the WINA20.386 file if you do not use Windows 3.0 in 386 enhanced mode.

► To delete the WINA20.386 file:

1. Remove the read-only attribute by typing the following at the command prompt:
attrib -r c:\wina20.386
2. Delete the file by typing the following at the command prompt:
del c:\wina20.386

Can I move the WINA20.386 file?

Yes. If you want to move the WINA20.386 file to a subdirectory, carry out the following procedure:

► To move the WINA20.386 file:

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. Add the following command on a line of its own at the end of your CONFIG.SYS file:
switches=/w
3. Save your CONFIG.SYS file.
4. Next, use the text editor to open your Windows SYSTEM.INI file. (This file should be in your WINDOWS directory.)
5. Find the section that begins with [386Enh].
6. Add this command under the [386Enh] heading:
device=[drive:][path]wina20.386

The *drive* and *path* parameters specify the new location of the WINA20.386 file.

For example, if you want to move the file to your WINDOWS directory, add this command to your Windows SYSTEM.INI file:

device=c:\windows\wina20.386

7. Save your SYSTEM.INI file, and quit the text editor.
8. Restart your computer by pressing CTRL+ALT+DEL.

How do I run a program that uses extended memory but does not conform to the XMS?

Most programs using extended memory conform to the Lotus/Intel/Microsoft/AST Extended Memory Specification (XMS). To use such programs with MS-DOS 5.0, you need an extended memory manager, such as HIMEM. For information about HIMEM and extended memory, see Chapter 12 of the *Microsoft MS-DOS User's Guide and Reference*.

Some older programs do not conform to the XMS, however. Such programs cannot use extended memory that is managed according to the XMS.

If you are using HIMEM, you can allocate a portion of your extended memory to programs that use extended memory but do not conform to the XMS.

► **To allocate non-XMS extended memory:**

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. Find the **device** command that starts HIMEM.SYS.
3. At the end of this command, type **/int15=x**, where *x* represents the amount of memory (in kilobytes) you want to set aside, plus 64.

For example, to reserve 512K of non-XMS extended memory, you would include the following command in your CONFIG.SYS file:

device=c:\dos\himem.sys /int15=576

4. Save the CONFIG.SYS file, and quit the text editor.

NOTE Some of the programs that do not conform to the XMS cannot run when MS-DOS 5.0 is running in the high memory area. If you encounter problems with such a program, load MS-DOS 5.0 into conventional memory by removing the **dos=high** command from your CONFIG.SYS file.

How can I speed up task swapping in MS-DOS Shell?

You can improve the speed at which MS-DOS Shell performs task swapping if your computer has either extended or expanded memory. To do so, run RAMDrive, which creates a disk in memory (also called a RAM disk). Then, set the TEMP environment variable to your RAM disk. During task swapping, MS-DOS Shell saves certain files in the location specified by the TEMP environment variable. If the TEMP variable is set to a RAM disk, MS-DOS Shell performs task swapping much faster.

► To speed up task swapping:

1. Use a text editor, such as MS-DOS Editor, to open your CONFIG.SYS file.
2. To put your RAM disk in extended memory, make sure your CONFIG.SYS file contains a **device** command for HIMEM.SYS. If the file doesn't contain one, insert the following line at the beginning of the file:

```
device=c:\dos\himem.sys
```

To put your RAM disk in expanded memory, make sure your CONFIG.SYS file contains a **device** command for your memory board's memory manager. (For information about installing the memory manager, see the documentation that came with your memory board.)

3. Make sure your CONFIG.SYS file contains a **device** command for RAMDRIVE.SYS.
 - If you want to put your RAM disk in extended memory, make sure a command such as the following appears after the **device** command for HIMEM.SYS:

```
device=c:\dos\ramdrive.sys /e 1024
```

This command starts RAMDrive and directs it to use 1024K of extended memory to create a RAM disk. If your computer has more than 1024K of extended memory, you might want to specify a larger number in the **device** command for RAMDRIVE.SYS.

- If your CONFIG.SYS file doesn't contain a **device** command for RAMDRIVE.SYS and you want to put your RAM disk in expanded memory, make sure a **device** command such as the following appears after the **device** command for your expanded-memory manager:

```
device=c:\dos\ramdrive.sys /a 256
```

This command starts RAMDrive and directs it to use 256K of expanded memory to create a RAM disk. If your computer has more than 256K of expanded memory, you might want to specify a larger number on the **device** command for RAMDRIVE.SYS.

4. Save your CONFIG.SYS file.
5. Next, use the text editor to open your AUTOEXEC.BAT file.

Make sure the file contains a **set temp** command that specifies your RAM disk. This command specifies what drive and directory to use for temporary files. Your RAM disk will have the drive letter that follows your last disk drive. For example, if your hard disk is drive C, your RAM disk will be drive D. The following **set temp** command specifies the root directory of a RAM disk named D:

```
set temp=d:\
```

6. Save your AUTOEXEC.BAT file, and quit the text editor.
7. Restart your computer by pressing CTRL+ALT+DEL.

Appendix

Contents of the Setup Disks

This appendix contains an alphabetic list of every file on the MS-DOS 5.0 Setup disks. The list includes a brief description of each file and the number of the disk on which the file can be found.

The filename extensions of compressed files end with an underscore (_). If the final character of a filename extension is underlined in this list, the file is compressed on the Setup disks. For example, the listing ANSI.SYS indicates that this is a compressed file called ANSI.SY_ on Setup Disk 1. When Setup copies this file to your hard disk, it expands the file and names it ANSI.SYS.

If you need to retrieve a compressed file from the Setup disks, use the **expand** command, and make sure the expanded file is named with the underscored letter instead of the underscore (_) character. For more information, see the section "You accidentally delete an MS-DOS 5.0 file" in Chapter 3, "Troubleshooting."

Filename	Purpose	Disk number (5.25-inch)	Disk number (3.5-inch)
4201.CPI	Contains code-page information for IBM Proprinters II and III, Models 4201 and 4202.	2	3
4208.CPI	Contains code-page information for IBM Proprinters X24E Model 4207, XL24E Model 4208, and compatible models.	2	3
5202.CPI	Contains code-page information for IBM Quietwriter III Printer Model 5202 and compatible models.	2	3
8514.VID	Enables an 8514/a monitor to work with MS-DOS Shell.	1	1
ANSI.SY <u>S</u>	Defines functions that change display graphics, control cursor movement, and reassign keys.	1	1
APPEND.EXE	Enables programs to open data files as if they were in the current directory, even when they are not.	2	3
APPNOTES.TXT	Contains information about running specific programs with MS-DOS 5.0.	1	2

Filename	Purpose	Disk number (5.25-inch)	Disk number (3.5-inch)
ASSIGN.COM	Redirects requests for disk operations on one drive to a different drive.	2	3
ATTRIB.EXE	Displays or changes file attributes.	2	3
AUTOEXEC.BAT	Contains commands that are carried out each time you start your computer.	1	1
BACKUP.EXE	Backs up one or more files from one disk to another.	2	3
CGA.GRB	Enables you to capture an MS-DOS Shell screen image with a CGA monitor.	1	2
CGA.INI	Contains the video information that is needed to run MS-DOS Shell with a CGA monitor.	1	2
CGA.VID	Enables a CGA monitor to work with MS-DOS Shell.	1	2
CHKDSK.EXE	Finds and reports errors on a disk.	2	3
COMMAND.COM	Displays the command prompt, interprets the commands you type, and contains internal MS-DOS 5.0 commands.	1	1
COMP.EXE	Compares the contents of two files or two sets of files, byte by byte.	2	3
COUNTRY.SYS	Contains country-specific information.	1	1
CV.COM	The CodeView debugging program for MS-DOS programmers.	1	1
DEBUG.EXE	Displays information that helps programmers test and debug MS-DOS programs.	1	1
DISKCOMP.COM	Compares the contents of two floppy disks.	2	3
DISKCOPY.COM	Copies the entire contents of one floppy disk to another.	2	3
DISPLAY.SYS	A device driver that supports different extended character sets (code pages).	1	1

Filename	Purpose	Disk number (5.25-inch)	Disk number (3.5-inch)
DOSHELP.HLP	Contains information about the MS-DOS 5.0 commands that you type at the command prompt.	1	2
DOSKEY.COM	Enables you to redisplay and edit previous commands and create simple macros.	1	1
DOSSHELL.COM	The memory-resident portion of MS-DOS Shell; loads the DOSSHELL.EXE file.	1	2
DOSSHELL.EXE	The MS-DOS Shell program, a graphical interface for MS-DOS 5.0.	1	2
DOSSHELL.HLP	Contains information about the MS-DOS 5.0 commands in MS-DOS Shell.	1	2
DOSSWAP.EXE	Enables you to switch between programs that have been started from MS-DOS Shell.	1	2
DRIVER.SYS	Creates a logical drive that you can use to refer to a physical floppy disk drive.	2	3
EDIT.COM	A full-screen, menu-driven text editor.	2	2
EDIT.HLP	Contains information about MS-DOS Editor commands and procedures.	1	2
EDLIN.EXE	A line-oriented text editor.	1	1
EGA.CPI	Contains code-page information for EGA monitors.	1	1
EGA.GRB	Enables you to capture an MS-DOS Shell screen image with an EGA monitor.	1	2
EGA.INI	Contains the video information that is needed to run MS-DOS Shell with an EGA or VGA monitor.	1	2
EGA.SYS	Saves and restores the display when the MS-DOS Shell Task Swapper is used with EGA monitors.	1	1
EGA.VID	Enables an EGA monitor to work with MS-DOS Shell.	1	2

Filename	Purpose	Disk number (5.25-inch)	Disk number (3.5-inch)
<u>EGAMONO.GRB</u>	Enables you to capture an MS-DOS Shell screen image with a monochrome EGA monitor.	1	2
<u>EMM386.EXE</u>	Simulates expanded memory in extended memory and provides access to the upper memory area on computers with an 80386 or 80486 processor.	1	1
<u>EXE2BIN.EXE</u>	Converts executable files to binary format.	2	3
<u>EXPAND.EXE</u>	Expands compressed files and copies the expanded version to the directory or disk drive you specify.	2	3
<u>FASTOPEN.EXE</u>	Decreases the time needed to open frequently used files.	1	1
<u>FC.EXE</u>	Compares the contents of two files and displays the differences between them.	2	3
<u>FDISK.EXE</u>	Creates, deletes, and activates partitions on a hard disk.	1	1
<u>FIND.EXE</u>	Searches for specific text in a file or files.	2	3
<u>FORMAT.COM</u>	Formats a disk.	1	1
<u>GORILLA.BAS</u>	A sample QBasic program.	2	3
<u>GRAFTABL.COM</u>	Enables MS-DOS 5.0 to display the extended characters of a specified code page in graphics mode.	2	3
<u>GRAPHICS.COM</u>	Enables MS-DOS 5.0 to print the contents of a screen when you are using a color or graphics video adapter.	2	3
<u>GRAPHICS.PRO</u>	Contains information about supported printers, used by the graphics command.	2	3
<u>HELP.EXE</u>	Provides information about specific MS-DOS 5.0 commands.	1	2
<u>HERC.GRB</u>	Enables you to capture an MS-DOS Shell screen image with a Hercules monitor.	1	2
<u>HERC.VID</u>	Enables a Hercules monitor to work with MS-DOS Shell.	1	2

Filename	Purpose	Disk number (5.25-inch)	Disk number (3.5-inch)
HIMEM.SYS	Manages extended memory.	1	1
IO.SYS	The MS-DOS 5.0 basic input/output system (BIOS). Prepares your system at startup and contains resident device drivers.	1	1
JOIN.EXE	Joins a disk drive with a directory on another disk drive.	2	3
KEYB.COM	Configures a keyboard for a specific language.	1	1
KEYBOARD.SYS	A device driver that supports different keyboard layouts.	1	1
LABEL.EXE	Creates, changes, or deletes the volume label of a disk.	2	3
LCD.CPI	Contains code-page information for liquid crystal displays.	2	3
LOADFIX.COM	Fills the first 64K of conventional memory so no programs load there.	2	3
MEM.EXE	Displays information about how much memory is being used.	1	1
MIRROR.COM	Keeps track of information on a disk so you can recover deleted files or restore a reformatted disk.	1	1
MODE.COM	Configures devices, such as printers, monitors, keyboards, and communications ports.	1	1
MONEY.BAS	A sample QBasic program.	2	2
MONO.GRB	Enables you to capture an MS-DOS Shell screen image with a monochrome monitor.	1	2
MONO.INI	Contains the video information that is needed to run MS-DOS Shell with a monochrome monitor.	1	2
MORE.COM	Enables you to display one screen of output at a time, when the output of a command is longer than one screen.	2	3
MSDOS.SYS	The MS-DOS 5.0 kernel. Manages files, directories, memory, environments, and country-specific configurations.	1	1

Filename	Purpose	Disk number (5.25-inch)	Disk number (3.5-inch)
<u>MSHERC.COM</u>	Provides support for a Hercules monitor running with MS-DOS Editor or QBasic.	2	2
<u>NIBBLES.BAS</u>	A sample QBasic program.	2	3
<u>NLSFUNC.EXE</u>	Provides national language support for all your devices at once.	1	1
<u>PACKING.LST</u>	Lists the files on each Setup disk and on each of the MS-DOS 5.0 disks that you create with the setup /f command.	1	2
<u>PRINT.EXE</u>	Prints unformatted text files.	1	2
<u>PRINTER.SYS</u>	A device driver that supports code page switching for parallel ports.	2	3
<u>PRINTFIX.COM</u>	Disables verification of a printer's status.	2	3
<u>QBASIC.EXE</u>	Starts MS-DOS QBasic, an environment for creating and executing Basic-language programs.	2	2
<u>QBASIC.HLP</u>	Contains information about QBasic.	2	2
<u>RAMDRIVE.SYS</u>	Reserves a portion of random-access memory (RAM) to simulate a very fast disk drive.	1	1
<u>README.1ST</u>	Contains a brief note about the location of important text files.	1	1
<u>README.TXT</u>	Contains information about MS-DOS 5.0 that is hardware-specific or became available too late to be printed in the manuals.	2	3
<u>RECOVER.EXE</u>	Recovers readable information from a defective disk.	1	2
<u>REMLINE.BAS</u>	A sample QBasic program.	2	3
<u>REPLACE.EXE</u>	Replaces files in one directory with files that have the same name in another directory.	2	3
<u>RESTORE.EXE</u>	Restores files that were backed up by using the backup command.	2	3
<u>SETUP.EXE</u>	Installs MS-DOS 5.0 on a hard disk or floppy disks.	1	1

Filename	Purpose	Disk number (5.25-inch)	Disk number (3.5-inch)
SETUP.INI	Contains information that the Setup programs needs to run properly.	1	1
SETVER.EXE	Reports a different version number of DOS to programs that were designed for a specific version.	1	1
SHARE.EXE	Provides support for sharing and locking files on a network.	1	1
SMARTDRV.SYS	Creates a disk cache in extended or expanded memory.	1	1
SORT.EXE	Sorts input and writes the results to the screen, a file, or another device.	2	3
SUBST.EXE	Associates a path with a drive letter.	2	3
SYS.COM	Creates a startup disk by copying the MS-DOS 5.0 system files (IO.SYS and MSDOS.SYS) and command interpreter (COMMAND.COM) to a disk.	1	1
TREE.COM	Graphically displays the directory structure of a path or drive.	2	3
UNDELETE.EXE	Restores files that were deleted with the del command.	1	1
UNFORMAT.COM	Restores a disk erased by the format command or restructured by the recover command.	1	1
VGA.GRB	Enables you to capture an MS-DOS Shell screen image with a VGA monitor.	1	2
VGA.VID	Enables a VGA monitor to work with MS-DOS Shell.	1	2
VGAMONO.GRB	Enables you to capture an MS-DOS Shell screen image with a monochrome VGA monitor.	1	2
WINA20.386	Enables MS-DOS 5.0 to run with Microsoft Windows in 386 enhanced mode.	2	3
XCOPY.EXE	Copies files and directories.	1	1

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